Arizona Grade 6 Mathematics

140 Day Student Workbook

Build mathematical fluency and understanding through short explanations, worked examples, progressively harder practice, and regular assessments. This book contains 112 instructional lessons, 19 quizzes, and 9 unit tests.

Name _____ School year _____

Every lesson includes its day number, unit and lesson name, Arizona standards, a learning target, two worked examples, and 10 classwork problems. Use the separate teacher book for answers and solution notes.

Show your work. Simplify fractions unless a problem requests another form. Exact fractions and equivalent mixed numbers are both acceptable. State units and explain your reasoning when asked.

Use a ruler, fraction strips, and graph paper when useful. The reusable grids at the back can be photocopied. Unless your teacher directs otherwise, complete arithmetic by hand; calculators may be used to check completed work.

Practice order: 1–3 foundations, 4–6 connected steps, 7–8 explanation and representation, 9–10 application or justification. Within assessments, review comes first, followed by increasingly demanding current-unit tasks.

This is an independent curriculum with original writing and exercises. Spectrum Math is an optional companion published by Carson Dellosa Education; this workbook is not a publisher edition or endorsed product.

Units and Assessment Days

Unit 1 • Days 1–15 • Whole Numbers and Decimals

Quiz days 5, 10; unit test day 15

Unit 2 • Days 16–30 • Fraction Operations and Models

Quiz days 20, 25; unit test day 30

Unit 3 • Days 31–45 • Ratios and Measurement

Quiz days 35, 40; unit test day 45

Unit 4 • Days 46–60 • Rates and Percents

Quiz days 50, 55; unit test day 60

Unit 5 • Days 61–75 • Rational Numbers and Coordinates

Quiz days 65, 70; unit test day 75

Units and Assessment Days

Unit 6 • Days 76–90 • Expressions and Equivalence

Quiz days 80, 85; unit test day 90

Unit 7 • Days 91–105 • Equations Inequalities and Relationships

Quiz days 95, 100; unit test day 105

Unit 8 • Days 106–120 • Area Volume and Surface Area

Quiz days 110, 115; unit test day 120

Unit 9 • Days 121–135 • Statistics and Data Displays

Quiz days 125, 130; unit test day 135

Unit 10 • Days 136–140 • Final Applications and Review

Quiz days 140; five-day final review unit

Name _____ Date _____

Whole Numbers and Decimals

Lesson 1 Long Division and Place Value

Standards 6.NS.B.2

Learning target I can divide multi-digit whole numbers and check the quotient.

Learn and Discuss

Estimate the quotient first. Divide, multiply, subtract, and bring down one digit at a time. Keep each quotient digit in its place; write zero when needed. Check dividend = divisor × quotient + remainder.

Example 1 Use long division: 138 ÷ 6. Show the algorithm and check.
Solution 23. 13 ÷ 6: write 2, subtract 12, remainder 1; bring down the next digit: 18 ÷ 6: write 3, subtract 18, remainder 0. Check: 6 × 23 = 138.
Example 2 Use long division: 12,183 ÷ 34. Show the algorithm and check.
Solution 358 R 11. 121 ÷ 34: write 3, subtract 102, remainder 19; bring down the next digit: 198 ÷ 34: write 5, subtract 170, remainder 28; bring down the next digit: 283 ÷ 34: write 8, subtract 272, remainder 11. Check: 34 × 358 + 11 = 12183.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Long Division and Place Value

Name _____ Show calculations, models, and units.

1. Use long division: 438 ÷ 6. Show the algorithm and check.

2. Use long division: 175 ÷ 7. Show the algorithm and check.

3. Use long division: 252 ÷ 6. Show the algorithm and check.

4. Use long division: 14,174 ÷ 38. Show the algorithm and check.

5. Use long division: 3,388 ÷ 14. Show the algorithm and check.

6. Use long division: 12,408 ÷ 33. Show the algorithm and check.

7. Use long division: 5,492 ÷ 29. Show the algorithm and check.

8. Use long division: 5,575 ÷ 21. Show the algorithm and check.

9. A club has 2351 cards. Each full packet holds 15. How many full packets can it make, and how many cards remain?

10. A club has 3245 cards. Each full packet holds 12. How many full packets can it make, and how many cards remain?

Name _____ Date _____

Whole Numbers and Decimals

Lesson 2 Quotients with Zero Digits

Standards 6.NS.B.2

Learning target I can divide multi-digit whole numbers and check the quotient.

Learn and Discuss

Estimate the quotient first. Divide, multiply, subtract, and bring down one digit at a time. Keep each quotient digit in its place; write zero when needed. Check dividend = divisor × quotient + remainder.

Example 1 Use long division: 603 ÷ 3. Show the algorithm and check.
Solution 201. 6 ÷ 3: write 2, subtract 6, remainder 0; bring down the next digit: 0 ÷ 3: write 0, subtract 0, remainder 0; bring down the next digit: 3 ÷ 3: write 1, subtract 3, remainder 0. Check: 3 × 201 = 603.
Example 2 Use long division: 8,752 ÷ 29. Show the algorithm and check.
Solution 301 R 23. 87 ÷ 29: write 3, subtract 87, remainder 0; bring down the next digit: 5 ÷ 29: write 0, subtract 0, remainder 5; bring down the next digit: 52 ÷ 29: write 1, subtract 29, remainder 23. Check: 29 × 301 + 23 = 8752.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Quotients with Zero Digits

Name _____ Show calculations, models, and units.

1. Use long division: 728 ÷ 7. Show the algorithm and check.

2. Use long division: 903 ÷ 3. Show the algorithm and check.

3. Use long division: 420 ÷ 4. Show the algorithm and check.

4. Use long division: 7,218 ÷ 18. Show the algorithm and check.

5. Use long division: 2,484 ÷ 23. Show the algorithm and check.

6. Use long division: 1,744 ÷ 16. Show the algorithm and check.

7. Use long division: 10,696 ÷ 35. Show the algorithm and check.

8. Use long division: 2,311 ÷ 22. Show the algorithm and check.

9. A club has 4751 cards. Each full packet holds 23. How many full packets can it make, and how many cards remain?

10. A club has 9530 cards. Each full packet holds 31. How many full packets can it make, and how many cards remain?

Name _____ Date _____

Whole Numbers and Decimals

Lesson 3 Adding Decimals

Standards 6.NS.B.3

Learning target I can add decimals by aligning equal place values.

Learn and Discuss

Line up decimal points so tenths are under tenths and hundredths under hundredths. Add zeros if helpful. Add from right to left, regroup, and bring the decimal point straight down.

Example 1 Use the standard algorithm: 19.1 + 2.6. Show your regrouping or division steps.
Solution 21.7. Align decimal points; 19.1 + 2.6 = 21.7.
Example 2 Use the standard algorithm: 6.2 + 0.4. Show your regrouping or division steps.
Solution 6.6. Align decimal points; 6.2 + 0.4 = 6.6.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 3 Adding Decimals

Name _____ Show calculations, models, and units.

1. Use the standard algorithm: 76.1 + 4.8. Show your regrouping or division steps.

2. Use the standard algorithm: 63.1 + 4.4. Show your regrouping or division steps.

3. Use the standard algorithm: 82.5 + 7.1. Show your regrouping or division steps.

4. Use the standard algorithm: 3 + 4.3. Show your regrouping or division steps.

5. Use the standard algorithm: 5.86 + 3.7. Show your regrouping or division steps.

6. Use the standard algorithm: 7.01 + 8.8. Show your regrouping or division steps.

7. Use the standard algorithm: 8.94 + 0.69. Show your regrouping or division steps.

8. Use the standard algorithm: 6.68 + 0.52. Show your regrouping or division steps.

9. A runner walks 8.36 km in the morning and 0.82 km later. What is the total distance?

10. A runner walks 5.45 km in the morning and 0.61 km later. What is the total distance?

Name _____ Date _____

Whole Numbers and Decimals

Lesson 4 Subtracting Decimals

Standards 6.NS.B.3

Learning target I can subtract decimals and explain regrouping.

Learn and Discuss

Align decimal points and add placeholder zeros. Regroup one whole as ten tenths, or one tenth as ten hundredths. Subtract by place and check by adding the difference to the subtrahend.

Example 1 Use the standard algorithm: 88.6 - 8.8. Show your regrouping or division steps.
Solution 79.8. Align decimal points; 88.6 - 8.8 = 79.8.
Example 2 Use the standard algorithm: 3.22 - 0.48. Show your regrouping or division steps.
Solution 2.74. Align decimal points; 3.22 - 0.48 = 2.74.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Subtracting Decimals

Name _____ Show calculations, models, and units.

1. Use the standard algorithm: 65.1 - 7.8. Show your regrouping or division steps.

2. Use the standard algorithm: 83.1 - 5.3. Show your regrouping or division steps.

3. Use the standard algorithm: 21 - 1.5. Show your regrouping or division steps.

4. Use the standard algorithm: 6 - 3.77. Show your regrouping or division steps.

5. Use the standard algorithm: 8.13 - 6.6. Show your regrouping or division steps.

6. Use the standard algorithm: 4.25 - 3.3. Show your regrouping or division steps.

7. Use the standard algorithm: 3.27 - 0.44. Show your regrouping or division steps.

8. Use the standard algorithm: 9.14 - 0.87. Show your regrouping or division steps.

9. A tank holds 7.85 L. A class uses 0.15 L. How much remains?

10. A tank holds 4.73 L. A class uses 0.79 L. How much remains?

Name _____ Date _____

Whole Numbers and Decimals

Quiz 1

Standards assessed Grade 5 prerequisite, 6.NS.B.2, 6.NS.B.3

Questions 1–1 review Grade 5 prerequisites (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Use long division: 120 ÷ 5. Show the algorithm and check.

2. [Current unit] Use long division: 8,296 ÷ 34. Show the algorithm and check.

3. [Current unit] Use long division: 4,298 ÷ 14. Show the algorithm and check.

4. [Current unit] Use the standard algorithm: 3.39 + 0.7. Show your regrouping or division steps.

5. [Current unit] A tank holds 1.59 L. A class uses 0.43 L. How much remains?

Name _____ Date _____

Whole Numbers and Decimals

Lesson 5 Multiplying Decimals

Standards 6.NS.B.3

Learning target I can multiply decimals and use an estimate to place the decimal point.

Learn and Discuss

Multiply as whole numbers using the standard algorithm. The product has the total number of decimal places in the two factors before trailing zeros are removed. Check its size against an estimate.

Example 1 Use the standard algorithm: 17.7 × 7.6. Show your regrouping or division steps.
Solution 134.52. Compute the whole-number product and restore decimal places: 17.7 × 7.6 = 134.52.
Example 2 Use the standard algorithm: 4.28 × 0.77. Show your regrouping or division steps.
Solution 3.2956. Compute the whole-number product and restore decimal places: 4.28 × 0.77 = 3.2956.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 5 Multiplying Decimals

Name _____ Show calculations, models, and units.

1. Use the standard algorithm: 39.7 × 5.2. Show your regrouping or division steps.

2. Use the standard algorithm: 29.4 × 3.9. Show your regrouping or division steps.

3. Use the standard algorithm: 68.4 × 1.3. Show your regrouping or division steps.

4. Use the standard algorithm: 4.86 × 5.2. Show your regrouping or division steps.

5. Use the standard algorithm: 3.5 × 3.9. Show your regrouping or division steps.

6. Use the standard algorithm: 8.93 × 2.1. Show your regrouping or division steps.

7. Use the standard algorithm: 2.54 × 0.26. Show your regrouping or division steps.

8. Use the standard algorithm: 7.49 × 0.21. Show your regrouping or division steps.

9. Ribbon costs $7.16 per meter. What is the exact cost of 0.51 meters? Do not round.

10. Ribbon costs $1.42 per meter. What is the exact cost of 0.5 meters? Do not round.

Name _____ Date _____

Whole Numbers and Decimals

Lesson 6 Decimal Products in Context

Standards 6.NS.B.3

Learning target I can multiply decimals and use an estimate to place the decimal point.

Learn and Discuss

Multiply as whole numbers using the standard algorithm. The product has the total number of decimal places in the two factors before trailing zeros are removed. Check its size against an estimate.

Example 1 Use the standard algorithm: 29.2 × 7.2. Show your regrouping or division steps.
Solution 210.24. Compute the whole-number product and restore decimal places: 29.2 × 7.2 = 210.24.
Example 2 Use the standard algorithm: 7.53 × 0.64. Show your regrouping or division steps.
Solution 4.8192. Compute the whole-number product and restore decimal places: 7.53 × 0.64 = 4.8192.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 6 Decimal Products in Context

Name _____ Show calculations, models, and units.

1. Use the standard algorithm: 89.7 × 4.3. Show your regrouping or division steps.

2. Use the standard algorithm: 46.4 × 1.2. Show your regrouping or division steps.

3. Use the standard algorithm: 22 × 3.6. Show your regrouping or division steps.

4. Use the standard algorithm: 4.67 × 1.5. Show your regrouping or division steps.

5. Use the standard algorithm: 6.23 × 4.7. Show your regrouping or division steps.

6. Use the standard algorithm: 3.38 × 2.6. Show your regrouping or division steps.

7. Use the standard algorithm: 4.03 × 0.26. Show your regrouping or division steps.

8. Use the standard algorithm: 1.7 × 0.72. Show your regrouping or division steps.

9. Ribbon costs $5.67 per meter. What is the exact cost of 0.73 meters? Do not round.

10. Ribbon costs $5.7 per meter. What is the exact cost of 0.6 meters? Do not round.

Name _____ Date _____

Whole Numbers and Decimals

Lesson 7 Dividing by Decimals

Standards 6.NS.B.3

Learning target I can divide by a decimal using an equivalent whole-number divisor.

Learn and Discuss

Multiply both dividend and divisor by the same power of 10 so the divisor is a whole number. Then use long division, adding zeros to the dividend as needed. Check by multiplication.

Example 1 Use the standard algorithm: 34.5 ÷ 0.5. Show your regrouping or division steps.
Solution 69. Multiply both numbers by 10: 345 ÷ 5 = 69. Check: 0.5 × 69 = 34.5.
Example 2 Use the standard algorithm: 2.496 ÷ 0.32. Show your regrouping or division steps.
Solution 7.8. Multiply both numbers by 100: 249.6 ÷ 32 = 7.8. Check: 0.32 × 7.8 = 2.496.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 7 Dividing by Decimals

Name _____ Show calculations, models, and units.

1. Use the standard algorithm: 8.1 ÷ 0.3. Show your regrouping or division steps.

2. Use the standard algorithm: 60 ÷ 0.8. Show your regrouping or division steps.

3. Use the standard algorithm: 21 ÷ 0.7. Show your regrouping or division steps.

4. Use the standard algorithm: 18.24 ÷ 2.4. Show your regrouping or division steps.

5. Use the standard algorithm: 12.72 ÷ 2.4. Show your regrouping or division steps.

6. Use the standard algorithm: 47.36 ÷ 6.4. Show your regrouping or division steps.

7. Use the standard algorithm: 0.608 ÷ 0.32. Show your regrouping or division steps.

8. Use the standard algorithm: 0.64 ÷ 0.32. Show your regrouping or division steps.

9. A container has 0.928 kg of seed. Each bag holds 0.32 kg. How many bags can be filled?

10. A container has 2.016 kg of seed. Each bag holds 0.24 kg. How many bags can be filled?

Name _____ Date _____

Whole Numbers and Decimals

Lesson 8 Decimal Quotients and Checks

Standards 6.NS.B.3

Learning target I can divide by a decimal using an equivalent whole-number divisor.

Learn and Discuss

Multiply both dividend and divisor by the same power of 10 so the divisor is a whole number. Then use long division, adding zeros to the dividend as needed. Check by multiplication.

Example 1 Use the standard algorithm: 50.4 ÷ 0.7. Show your regrouping or division steps.
Solution 72. Multiply both numbers by 10: 504 ÷ 7 = 72. Check: 0.7 × 72 = 50.4.
Example 2 Use the standard algorithm: 2.92 ÷ 0.4. Show your regrouping or division steps.
Solution 7.3. Multiply both numbers by 10: 29.2 ÷ 4 = 7.3. Check: 0.4 × 7.3 = 2.92.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 8 Decimal Quotients and Checks

Name _____ Show calculations, models, and units.

1. Use the standard algorithm: 40.5 ÷ 0.9. Show your regrouping or division steps.

2. Use the standard algorithm: 20.1 ÷ 0.3. Show your regrouping or division steps.

3. Use the standard algorithm: 23.7 ÷ 0.3. Show your regrouping or division steps.

4. Use the standard algorithm: 10 ÷ 2.5. Show your regrouping or division steps.

5. Use the standard algorithm: 13.68 ÷ 2.4. Show your regrouping or division steps.

6. Use the standard algorithm: 6 ÷ 2.4. Show your regrouping or division steps.

7. Use the standard algorithm: 0.825 ÷ 0.15. Show your regrouping or division steps.

8. Use the standard algorithm: 0.8 ÷ 0.25. Show your regrouping or division steps.

9. A container has 2.368 kg of seed. Each bag holds 0.64 kg. How many bags can be filled?

10. A container has 0.768 kg of seed. Each bag holds 0.24 kg. How many bags can be filled?

Name _____ Date _____

Whole Numbers and Decimals

Quiz 2

Standards assessed Grade 5 prerequisite, 6.NS.B.3

Questions 1–1 review Grade 5 prerequisites (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Use long division: 84 ÷ 3. Show the algorithm and check.

2. [Current unit] Use the standard algorithm: 3.07 × 8.6. Show your regrouping or division steps.

3. [Current unit] Use the standard algorithm: 1.31 × 4.1. Show your regrouping or division steps.

4. [Current unit] Use the standard algorithm: 3.2 ÷ 0.4. Show your regrouping or division steps.

5. [Current unit] A container has 0.795 kg of seed. Each bag holds 0.15 kg. How many bags can be filled?

Name _____ Date _____

Whole Numbers and Decimals

Lesson 9 Greatest Common Factors

Standards 6.NS.B.4a

Learning target I can find the greatest common factor and interpret equal groups.

Learn and Discuss

List factor pairs or use prime factorizations. The greatest factor shared by both numbers is the GCF. For identical kits with no leftovers, the GCF gives the greatest number of kits.

Example 1 Find the GCF of 12 and 16. Show factor pairs or prime factors.
Solution 4. Common factors: 1, 2, 4; greatest is 4.
Example 2 Make the greatest possible number of identical kits from 18 pencils and 30 erasers with no leftovers. Find the number of kits and each kit's contents.
Solution 6 kits; 3 pencils and 5 erasers each. GCF(18, 30) = 6; divide both counts by 6.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 9 Greatest Common Factors

Name _____ Show calculations, models, and units.

1. Find the GCF of 12 and 16. Show factor pairs or prime factors.

2. Find the GCF of 8 and 12. Show factor pairs or prime factors.

3. Find the GCF of 10 and 15. Show factor pairs or prime factors.

4. Find the GCF of 45 and 60. Show factor pairs or prime factors.

5. Find the GCF of 24 and 36. Show factor pairs or prime factors.

6. Find the GCF of 18 and 30. Show factor pairs or prime factors.

7. Make the greatest possible number of identical kits from 60 pencils and 84 erasers with no leftovers. Find the number of kits and each kit’s contents.

8. Make the greatest possible number of identical kits from 48 pencils and 72 erasers with no leftovers. Find the number of kits and each kit’s contents.

9. Make the greatest possible number of identical kits from 70 pencils and 100 erasers with no leftovers. Find the number of kits and each kit’s contents.

10. Make the greatest possible number of identical kits from 12 pencils and 18 erasers with no leftovers. Find the number of kits and each kit’s contents.

Name _____ Date _____

Whole Numbers and Decimals

Lesson 10 Least Common Multiples

Standards 6.NS.B.4b

Learning target I can find the least common multiple of two numbers no greater than 12.

Learn and Discuss

List positive multiples of both numbers. The smallest shared multiple is the LCM. Repeating events that begin together next occur together after this many time units.

Example 1 Find the LCM of 6 and 2 by listing multiples.
Solution 6. The first positive multiple shared by 6 and 2 is 6.
Example 2 Two lights flash together now, then every 9 and 12 seconds. When do they next flash together? Explain.
Solution 36 seconds. The first positive multiple shared by 9 and 12 is 36.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Least Common Multiples

Name _____ Show calculations, models, and units.

1. Find the LCM of 4 and 3 by listing multiples.

2. Find the LCM of 4 and 6 by listing multiples.

3. Find the LCM of 5 and 4 by listing multiples.

4. Find the LCM of 9 and 11 by listing multiples.

5. Find the LCM of 6 and 3 by listing multiples.

6. Find the LCM of 10 and 8 by listing multiples.

7. Two lights flash together now, then every 2 and 3 seconds. When do they next flash together? Explain.

8. Two lights flash together now, then every 11 and 12 seconds. When do they next flash together? Explain.

9. Two lights flash together now, then every 3 and 5 seconds. When do they next flash together? Explain.

10. Two lights flash together now, then every 4 and 10 seconds. When do they next flash together? Explain.

Name _____ Date _____

Whole Numbers and Decimals

Lesson 11 Factoring Sums

Standards 6.NS.B.4c

Learning target I can factor a sum using the greatest common factor.

Learn and Discuss

Find the GCF of the two addends. Divide each addend by that factor and place the quotients inside parentheses. The inside numbers should share no common factor greater than 1.

Example 1 Factor 10 + 15 using its GCF. Make the inside numbers relatively prime.
Solution 5(2 + 3). GCF = 5; 10 = 5 × 2 and 15 = 5 × 3.
Example 2 Factor 18 + 30 using its GCF. Make the inside numbers relatively prime.
Solution 6(3 + 5). GCF = 6; 18 = 6 × 3 and 30 = 6 × 5.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 11 Factoring Sums

Name _____ Show calculations, models, and units.

1. Factor 6 + 9 using its GCF. Make the inside numbers relatively prime.

2. Factor 8 + 12 using its GCF. Make the inside numbers relatively prime.

3. Factor 10 + 15 using its GCF. Make the inside numbers relatively prime.

4. Factor 18 + 30 using its GCF. Make the inside numbers relatively prime.

5. Factor 45 + 60 using its GCF. Make the inside numbers relatively prime.

6. Factor 12 + 18 using its GCF. Make the inside numbers relatively prime.

7. Factor 48 + 72 using its GCF. Make the inside numbers relatively prime.

8. Factor 24 + 36 using its GCF. Make the inside numbers relatively prime.

9. Factor 60 + 84 using its GCF. Make the inside numbers relatively prime.

10. Factor 70 + 100 using its GCF. Make the inside numbers relatively prime.

Name _____ Date _____

Whole Numbers and Decimals

Lesson 12 Division with Remainders in Context

Standards 6.NS.B.2

Learning target I can divide multi-digit whole numbers and check the quotient.

Learn and Discuss

Estimate the quotient first. Divide, multiply, subtract, and bring down one digit at a time. Keep each quotient digit in its place; write zero when needed. Check dividend = divisor × quotient + remainder.

Example 1 Use long division: 90 ÷ 3. Show the algorithm and check.
Solution 30. 9 ÷ 3: write 3, subtract 9, remainder 0; bring down the next digit: 0 ÷ 3: write 0, subtract 0, remainder 0. Check: 3 × 30 = 90.
Example 2 Use long division: 7,931 ÷ 20. Show the algorithm and check.
Solution 396 R 11. 79 ÷ 20: write 3, subtract 60, remainder 19; bring down the next digit: 193 ÷ 20: write 9, subtract 180, remainder 13; bring down the next digit: 131 ÷ 20: write 6, subtract 120, remainder 11. Check: 20 × 396 + 11 = 7931.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 12 Division with Remainders in Context

Name _____ Show calculations, models, and units.

1. Use long division: 450 ÷ 6. Show the algorithm and check.

2. Use long division: 264 ÷ 3. Show the algorithm and check.

3. Use long division: 240 ÷ 6. Show the algorithm and check.

4. Use long division: 3,864 ÷ 21. Show the algorithm and check.

5. Use long division: 5,670 ÷ 35. Show the algorithm and check.

6. Use long division: 9,600 ÷ 32. Show the algorithm and check.

7. Use long division: 15,623 ÷ 39. Show the algorithm and check.

8. Use long division: 6,248 ÷ 35. Show the algorithm and check.

9. A club has 7318 cards. Each full packet holds 31. How many full packets can it make, and how many cards remain?

10. A club has 5087 cards. Each full packet holds 15. How many full packets can it make, and how many cards remain?

Name _____ Date _____

Whole Numbers and Decimals

Unit 1 Test

Standards assessed Grade 5 prerequisite, 6.NS.B.2, 6.NS.B.3, 6.NS.B.4a, 6.NS.B.4b, 6.NS.B.4c

Questions 1–4 review Grade 5 prerequisites (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 5 points per question; 100 points total.

1. [Review] Use long division: 320 ÷ 4. Show the algorithm and check.

2. [Review] Use the standard algorithm: 86 + 4.6. Show your regrouping or division steps.

3. [Review] Use the standard algorithm: 93.4 - 2.7. Show your regrouping or division steps.

4. [Review] Calculate 2 × 1/2. Simplify.

5. [Current unit] Use long division: 375 ÷ 5. Show the algorithm and check.

6. [Current unit] Use long division: 714 ÷ 7. Show the algorithm and check.

7. [Current unit] Use the standard algorithm: 17 + 1.2. Show your regrouping or division steps.

Name _____ Date _____

Whole Numbers and Decimals

Unit 1 Test

Standards assessed Grade 5 prerequisite, 6.NS.B.2, 6.NS.B.3, 6.NS.B.4a, 6.NS.B.4b, 6.NS.B.4c

8. [Current unit] Use the standard algorithm: 8.05 - 3. Show your regrouping or division steps.

9. [Current unit] Use the standard algorithm: 7.62 × 1.3. Show your regrouping or division steps.

10. [Current unit] Use the standard algorithm: 6.86 × 5.8. Show your regrouping or division steps.

11. [Current unit] Use the standard algorithm: 10.32 ÷ 2.4. Show your regrouping or division steps.

12. [Current unit] Use the standard algorithm: 26.56 ÷ 3.2. Show your regrouping or division steps.

13. [Current unit] Find the GCF of 60 and 84. Show factor pairs or prime factors.

14. [Current unit] Two lights flash together now, then every 2 and 12 seconds. When do they next flash together? Explain.

Name _____ Date _____

Whole Numbers and Decimals

Unit 1 Test

Standards assessed Grade 5 prerequisite, 6.NS.B.2, 6.NS.B.3, 6.NS.B.4a, 6.NS.B.4b, 6.NS.B.4c

15. [Current unit] Factor 28 + 42 using its GCF. Make the inside numbers relatively prime.

16. [Current unit] Use long division: 4,964 ÷ 13. Show the algorithm and check.

17. [Current unit] Use long division: 8,301 ÷ 25. Show the algorithm and check.

18. [Current unit] A club has 1683 cards. Each full packet holds 16. How many full packets can it make, and how many cards remain?

19. [Current unit] A runner walks 5.56 km in the morning and 0.51 km later. What is the total distance?

20. [Current unit] A tank holds 4.04 L. A class uses 0.53 L. How much remains?

Name _____ Date _____

Fraction Operations and Models

Lesson 1 Fraction Products as Preparation

Standards 6.NS.A.1

Learning target I can use fraction multiplication to prepare for fraction division.

Learn and Discuss

For a product of fractions, multiply numerators and multiply denominators, then simplify. Convert mixed numbers to improper fractions first. Multiplying by a fraction less than 1 makes a positive quantity smaller.

Example 1 Calculate 3/4 × 1/4. Simplify.
Solution 3/16. 3/4 × 1/4 = 3/16.
Example 2 Calculate 2 × 1. Simplify and explain why your answer is reasonable.
Solution 2. 2 × 1 = 2.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Fraction Products as Preparation

Name _____ Show calculations, models, and units.

1. Calculate 1/2 × 1/2. Simplify.

2. Calculate 1 × 1/4. Simplify.

3. Calculate 3/4 × 1/2. Simplify.

4. Calculate 1 × 1/8. Simplify.

5. Calculate 1 × 2/3. Simplify.

6. Calculate 3/5 × 5/8. Simplify.

7. Calculate 2/3 × 1/5. Simplify and explain why your answer is reasonable.

8. Calculate 1/2 × 1/5. Simplify and explain why your answer is reasonable.

9. Calculate 8/3 × 1. Simplify and explain why your answer is reasonable.

10. Calculate 4/3 × 5/2. Simplify and explain why your answer is reasonable.

Name _____ Date _____

Fraction Operations and Models

Lesson 2 Mixed Number Products

Standards 6.NS.A.1

Learning target I can use fraction multiplication to prepare for fraction division.

Learn and Discuss

For a product of fractions, multiply numerators and multiply denominators, then simplify. Convert mixed numbers to improper fractions first. Multiplying by a fraction less than 1 makes a positive quantity smaller.

Example 1 Calculate 2 1/4 × 2 1/4. Simplify.
Solution 81/16. 9/4 × 9/4 = 81/16.
Example 2 Calculate 1 1/2 × 2 1/4. Simplify and explain why your answer is reasonable.
Solution 27/8. 3/2 × 9/4 = 27/8.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Mixed Number Products

Name _____ Show calculations, models, and units.

1. Calculate 2 3/4 × 1 1/4. Simplify.

2. Calculate 2 1/4 × 2 1/4. Simplify.

3. Calculate 3 1/4 × 2 1/4. Simplify.

4. Calculate 2 1/2 × 2 1/2. Simplify.

5. Calculate 2 1/2 × 2 1/3. Simplify.

6. Calculate 1 3/4 × 2 1/4. Simplify.

7. Calculate 2 3/4 × 2 1/3. Simplify and explain why your answer is reasonable.

8. Calculate 3 1/4 × 1 1/2. Simplify and explain why your answer is reasonable.

9. Calculate 3 3/4 × 1 1/2. Simplify and explain why your answer is reasonable.

10. Calculate 1 3/4 × 2 1/2. Simplify and explain why your answer is reasonable.

Name _____ Date _____

Fraction Operations and Models

Lesson 3 Equal Groups in Fraction Bars

Standards 6.NS.A.1

Learning target I can model fraction division as equal-sized groups.

Learn and Discuss

A quotient asks how many groups of the divisor fit in the dividend. Rename both fractions with a common denominator, draw equal parts, and count groups. A partial group is a fraction of the divisor, not of the original whole.

Example 1 Draw a bar partitioned into 10 equal parts. Shade 6 parts. Circle groups of 4 parts. Use the model to find 3/5 ÷ 2/5.
Solution 3/2. Each small part is 1/10; 6 shaded parts divided into groups of 4 gives 6/4 = 3/2 groups.
Example 2 Draw a bar partitioned into 8 equal parts. Shade 7 parts. Circle groups of 1 parts. Use the model to find 7/8 ÷ 1/8. Explain the partial group.
Solution 7. Each small part is 1/8; 7 shaded parts divided into groups of 1 gives 7/1 = 7 groups.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

Fraction Model 3/4 ÷ 1/4 = 3 groups



Eight equal pieces show eighths. Every two pieces make 1/4; the shaded 3/4 contains three groups.

Lesson 3 Equal Groups in Fraction Bars

Name _____ Show calculations, models, and units.

1. Draw a bar partitioned into 6 equal parts. Shade 3 parts. Circle groups of 3 parts. Use the model to find 1/2 ÷ 1/2.

2. Draw a bar partitioned into 8 equal parts. Shade 3 parts. Circle groups of 3 parts. Use the model to find 3/8 ÷ 3/8.

3. Draw a bar partitioned into 12 equal parts. Shade 7 parts. Circle groups of 2 parts. Use the model to find 7/12 ÷ 1/6.

4. Draw a bar partitioned into 10 equal parts. Shade 7 parts. Circle groups of 4 parts. Use the model to find 7/10 ÷ 2/5.

5. Draw a bar partitioned into 10 equal parts. Shade 4 parts. Circle groups of 3 parts. Use the model to find 2/5 ÷ 3/10.

6. Draw a bar partitioned into 10 equal parts. Shade 5 parts. Circle groups of 5 parts. Use the model to find 1/2 ÷ 1/2.

7. Draw a bar partitioned into 10 equal parts. Shade 5 parts. Circle groups of 5 parts. Use the model to find 1/2 ÷ 1/2. Explain the partial group.

8. Draw a bar partitioned into 10 equal parts. Shade 6 parts. Circle groups of 2 parts. Use the model to find 3/5 ÷ 1/5. Explain the partial group.

9. Draw a bar partitioned into 8 equal parts. Shade 7 parts. Circle groups of 6 parts. Use the model to find 7/8 ÷ 3/4. Explain the partial group.

10. Draw a bar partitioned into 12 equal parts. Shade 9 parts. Circle groups of 7 parts. Use the model to find 3/4 ÷ 7/12. Explain the partial group.

Name _____ Date _____

Fraction Operations and Models

Lesson 4 Partial Groups in Fraction Bars

Standards 6.NS.A.1

Learning target I can model fraction division as equal-sized groups.

Learn and Discuss

A quotient asks how many groups of the divisor fit in the dividend. Rename both fractions with a common denominator, draw equal parts, and count groups. A partial group is a fraction of the divisor, not of the original whole.

Example 1 Draw a bar partitioned into 4 equal parts. Shade 2 parts. Circle groups of 1 parts. Use the model to find 1/2 ÷ 1/4.
Solution 2. Each small part is 1/4; 2 shaded parts divided into groups of 1 gives 2/1 = 2 groups.
Example 2 Draw a bar partitioned into 8 equal parts. Shade 7 parts. Circle groups of 7 parts. Use the model to find 7/8 ÷ 7/8. Explain the partial group.
Solution 1. Each small part is 1/8; 7 shaded parts divided into groups of 7 gives 7/7 = 1 groups.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

Fraction Model 3/4 ÷ 1/4 = 3 groups



Eight equal pieces show eighths. Every two pieces make 1/4; the shaded 3/4 contains three groups.

Lesson 4 Partial Groups in Fraction Bars

Name _____ Show calculations, models, and units.

1. Draw a bar partitioned into 6 equal parts. Shade 6 parts. Circle groups of 3 parts. Use the model to find 1 ÷ 1/2.

2. Draw a bar partitioned into 10 equal parts. Shade 8 parts. Circle groups of 3 parts. Use the model to find 4/5 ÷ 3/10.

3. Draw a bar partitioned into 10 equal parts. Shade 7 parts. Circle groups of 3 parts. Use the model to find 7/10 ÷ 3/10.

4. Draw a bar partitioned into 8 equal parts. Shade 8 parts. Circle groups of 4 parts. Use the model to find 1 ÷ 1/2.

5. Draw a bar partitioned into 8 equal parts. Shade 2 parts. Circle groups of 1 parts. Use the model to find 1/4 ÷ 1/8.

6. Draw a bar partitioned into 6 equal parts. Shade 3 parts. Circle groups of 2 parts. Use the model to find 1/2 ÷ 1/3.

7. Draw a bar partitioned into 6 equal parts. Shade 3 parts. Circle groups of 3 parts. Use the model to find 1/2 ÷ 1/2. Explain the partial group.

8. Draw a bar partitioned into 8 equal parts. Shade 2 parts. Circle groups of 2 parts. Use the model to find 1/4 ÷ 1/4. Explain the partial group.

9. Draw a bar partitioned into 10 equal parts. Shade 4 parts. Circle groups of 2 parts. Use the model to find 2/5 ÷ 1/5. Explain the partial group.

10. Draw a bar partitioned into 8 equal parts. Shade 8 parts. Circle groups of 8 parts. Use the model to find 1 ÷ 1. Explain the partial group.

Name _____ Date _____

Fraction Operations and Models

Quiz 1

Standards assessed 6.NS.B.2, 6.NS.A.1

Questions 1–1 review Unit 1 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Use long division: 1,442 ÷ 7. Show the algorithm and check.

2. [Current unit] Calculate 3/2 × 3/4. Simplify.

3. [Current unit] Calculate 3 1/4 × 1 1/4. Simplify.

4. [Current unit] Draw a bar partitioned into 10 equal parts. Shade 7 parts. Circle groups of 3 parts. Use the model to find 7/10 ÷ 3/10. Explain the partial group.

5. [Current unit] Draw a bar partitioned into 4 equal parts. Shade 4 parts. Circle groups of 2 parts. Use the model to find 1 ÷ 1/2. Explain the partial group.

Name _____ Date _____

Fraction Operations and Models

Lesson 5 Fraction Division and Reciprocals

Standards 6.NS.A.1

Learning target I can divide fractions and check using multiplication.

Learn and Discuss

If (a/b) ÷ (c/d) = q, then (c/d) × q = a/b. Multiplying by d/c undoes multiplying by c/d, so divide by a nonzero fraction by multiplying by its reciprocal. Simplify the product.

Example 1 Calculate 1/2 ÷ 1/4. Simplify.
Solution 2. 1/2 ÷ 1/4 = 1/2 × 4 = 2.
Example 2 Calculate 1 ÷ 1. Simplify and explain why your answer is reasonable.
Solution 1. 1 ÷ 1 = 1 × 1 = 1.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

Fraction Model 3/4 ÷ 1/4 = 3 groups



Eight equal pieces show eighths. Every two pieces make 1/4; the shaded 3/4 contains three groups.

Lesson 5 Fraction Division and Reciprocals

Name _____ Show calculations, models, and units.

1. Calculate 3/4 ÷ 1/4. Simplify.

2. Calculate 1/4 ÷ 1/2. Simplify.

3. Calculate 3/4 ÷ 1/2. Simplify.

4. Calculate 6/5 ÷ 2. Simplify.

5. Calculate 2 ÷ 5/4. Simplify.

6. Calculate 5/3 ÷ 1/2. Simplify.

7. Calculate 1 ÷ 1. Simplify and explain why your answer is reasonable.

8. Calculate 1/6 ÷ 1/2. Simplify and explain why your answer is reasonable.

9. Calculate 1/5 ÷ 1/2. Simplify and explain why your answer is reasonable.

10. Calculate 1/5 ÷ 5/2. Simplify and explain why your answer is reasonable.

Name _____ Date _____

Fraction Operations and Models

Lesson 6 Checking Fraction Quotients

Standards 6.NS.A.1

Learning target I can divide fractions and check using multiplication.

Learn and Discuss

If (a/b) ÷ (c/d) = q, then (c/d) × q = a/b. Multiplying by d/c undoes multiplying by c/d, so divide by a nonzero fraction by multiplying by its reciprocal. Simplify the product.

Example 1 Calculate 1/4 ÷ 1/4. Simplify.
Solution 1. 1/4 ÷ 1/4 = 1/4 × 4 = 1.
Example 2 Calculate 1/3 ÷ 1/4. Simplify and explain why your answer is reasonable.
Solution 4/3. 1/3 ÷ 1/4 = 1/3 × 4 = 4/3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

Fraction Model 3/4 ÷ 1/4 = 3 groups



Eight equal pieces show eighths. Every two pieces make 1/4; the shaded 3/4 contains three groups.

Lesson 6 Checking Fraction Quotients

Name _____ Show calculations, models, and units.

1. Calculate 1 ÷ 1/4. Simplify.

2. Calculate 1/2 ÷ 1/2. Simplify.

3. Calculate 1/4 ÷ 1/4. Simplify.

4. Calculate 3/2 ÷ 1/5. Simplify.

5. Calculate 1/3 ÷ 1. Simplify.

6. Calculate 2/3 ÷ 5/8. Simplify.

7. Calculate 3/8 ÷ 1/2. Simplify and explain why your answer is reasonable.

8. Calculate 2/3 ÷ 1. Simplify and explain why your answer is reasonable.

9. Calculate 3/4 ÷ 1/8. Simplify and explain why your answer is reasonable.

10. Calculate 2 ÷ 1. Simplify and explain why your answer is reasonable.

Name _____ Date _____

Fraction Operations and Models

Lesson 7 Dividing Mixed Numbers

Standards 6.NS.A.1

Learning target I can divide mixed numbers after renaming them as fractions.

Learn and Discuss

Rename a mixed number as (whole × denominator + numerator)/denominator. Keep the dividend, change division to multiplication, and use the reciprocal of the divisor. Simplify and interpret the result.

Example 1 Calculate 3 3/4 ÷ 1/4. Simplify.
Solution 15. 15/4 ÷ 1/4 = 15/4 × 4 = 15.
Example 2 Calculate 1 4/5 ÷ 1 3/8. Simplify and explain why your answer is reasonable.
Solution 72/55. 9/5 ÷ 11/8 = 9/5 × 8/11 = 72/55.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

Fraction Model 3/4 ÷ 1/4 = 3 groups



Eight equal pieces show eighths. Every two pieces make 1/4; the shaded 3/4 contains three groups.

Lesson 7 Dividing Mixed Numbers

Name _____ Show calculations, models, and units.

1. Calculate 2 1/4 ÷ 1/2. Simplify.

2. Calculate 3 ÷ 1/2. Simplify.

3. Calculate 3 ÷ 1/4. Simplify.

4. Calculate 2 3/5 ÷ 2. Simplify.

5. Calculate 3 ÷ 1 1/4. Simplify.

6. Calculate 4 2/3 ÷ 2 3/4. Simplify.

7. Calculate 2 2/3 ÷ 3. Simplify and explain why your answer is reasonable.

8. Calculate 2 3/4 ÷ 1 2/3. Simplify and explain why your answer is reasonable.

9. Calculate 2 1/2 ÷ 2 5/8. Simplify and explain why your answer is reasonable.

10. Calculate 3 1/2 ÷ 2. Simplify and explain why your answer is reasonable.

Name _____ Date _____

Fraction Operations and Models

Lesson 8 Mixed Number Quotients and Checks

Standards 6.NS.A.1

Learning target I can divide mixed numbers after renaming them as fractions.

Learn and Discuss

Rename a mixed number as (whole × denominator + numerator)/denominator. Keep the dividend, change division to multiplication, and use the reciprocal of the divisor. Simplify and interpret the result.

Example 1 Calculate 1 1/4 ÷ 1/4. Simplify.
Solution 5. 5/4 ÷ 1/4 = 5/4 × 4 = 5.
Example 2 Calculate 2 2/3 ÷ 2. Simplify and explain why your answer is reasonable.
Solution 4/3. 8/3 ÷ 2 = 8/3 × 1/2 = 4/3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

Fraction Model 3/4 ÷ 1/4 = 3 groups



Eight equal pieces show eighths. Every two pieces make 1/4; the shaded 3/4 contains three groups.

Lesson 8 Mixed Number Quotients and Checks

Name _____ Show calculations, models, and units.

1. Calculate 1 3/4 ÷ 1/2. Simplify.

2. Calculate 2 3/4 ÷ 1/2. Simplify.

3. Calculate 1 1/4 ÷ 1/4. Simplify.

4. Calculate 3 3/4 ÷ 3 1/2. Simplify.

5. Calculate 3 3/4 ÷ 2 1/8. Simplify.

6. Calculate 1 1/2 ÷ 1 1/2. Simplify.

7. Calculate 3 1/2 ÷ 4. Simplify and explain why your answer is reasonable.

8. Calculate 4 ÷ 2 1/2. Simplify and explain why your answer is reasonable.

9. Calculate 1 4/5 ÷ 1 1/2. Simplify and explain why your answer is reasonable.

10. Calculate 3 ÷ 2 1/4. Simplify and explain why your answer is reasonable.

Name _____ Date _____

Fraction Operations and Models

Quiz 2

Standards assessed 6.NS.B.3, 6.NS.A.1

Questions 1–1 review Unit 1 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Use the standard algorithm: 11.4 ÷ 0.3. Show your regrouping or division steps.

2. [Current unit] Calculate 1 ÷ 1/2. Simplify.

3. [Current unit] Calculate 4/3 ÷ 1. Simplify.

4. [Current unit] Calculate 4 2/5 ÷ 2 1/4. Simplify and explain why your answer is reasonable.

5. [Current unit] Calculate 4 ÷ 1 1/4. Simplify and explain why your answer is reasonable.

Name _____ Date _____

Fraction Operations and Models

Lesson 9 Interpreting Fraction Division Stories

Standards 6.NS.A.1

Learning target I can write and solve a fraction-division equation for a situation.

Learn and Discuss

Identify the total amount and the size of one group. Use total ÷ group size for the number of groups. A quotient may include a partial group; if the question asks for full servings, use only the whole-number part.

Example 1 A ribbon is 1/4 m long. Each piece is 1/4 m. How many piece-lengths are in the ribbon? Include any fractional piece.
Solution 1 piece-lengths. 1/4 ÷ 1/4 = 1/4 × 4 = 1.
Example 2 A jug contains 7/8 L. Each full bottle needs 4/3 L. How many full bottles can be filled, and how much liquid remains?
Solution 0 bottles; 7/8 L left. 7/8 ÷ 4/3 = 7/8 × 3/4 = 21/32. Only whole bottles count; subtract the liquid used.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 9 Interpreting Fraction Division Stories

Name _____ Show calculations, models, and units.

1. A ribbon is 1/4 m long. Each piece is 1/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

2. A ribbon is 1/4 m long. Each piece is 1/4 m. How many piece-lengths are in the ribbon? Include any fractional piece.

3. A ribbon is 1 m long. Each piece is 1/4 m. How many piece-lengths are in the ribbon? Include any fractional piece.

4. A ribbon is 1/3 m long. Each piece is 3/5 m. How many piece-lengths are in the ribbon? Include any fractional piece.

5. A ribbon is 7/8 m long. Each piece is 4/3 m. How many piece-lengths are in the ribbon? Include any fractional piece.

6. A ribbon is 1 1/4 m long. Each piece is 4/3 m. How many piece-lengths are in the ribbon? Include any fractional piece.

7. A jug contains 1 L. Each full bottle needs 1 L. How many full bottles can be filled, and how much liquid remains?

8. A jug contains 1/3 L. Each full bottle needs 3/2 L. How many full bottles can be filled, and how much liquid remains?

9. A jug contains 3/5 L. Each full bottle needs 1 L. How many full bottles can be filled, and how much liquid remains?

10. A jug contains 2 1/2 L. Each full bottle needs 5/2 L. How many full bottles can be filled, and how much liquid remains?

Name _____ Date _____

Fraction Operations and Models

Lesson 10 Full Containers and Leftovers

Standards 6.NS.A.1

Learning target I can write and solve a fraction-division equation for a situation.

Learn and Discuss

Identify the total amount and the size of one group. Use total ÷ group size for the number of groups. A quotient may include a partial group; if the question asks for full servings, use only the whole-number part.

Example 1 A ribbon is 1/4 m long. Each piece is 1/4 m. How many piece-lengths are in the ribbon? Include any fractional piece.
Solution 1 piece-lengths. 1/4 ÷ 1/4 = 1/4 × 4 = 1.
Example 2 A jug contains 1/2 L. Each full bottle needs 1 L. How many full bottles can be filled, and how much liquid remains?
Solution 0 bottles; 1/2 L left. 1/2 ÷ 1 = 1/2 × 1 = 1/2. Only whole bottles count; subtract the liquid used.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Full Containers and Leftovers

Name _____ Show calculations, models, and units.

1. A ribbon is 1/2 m long. Each piece is 1/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

2. A ribbon is 1 m long. Each piece is 1/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

3. A ribbon is 3/4 m long. Each piece is 1/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

4. A ribbon is 1 1/2 m long. Each piece is 1 m. How many piece-lengths are in the ribbon? Include any fractional piece.

5. A ribbon is 1 1/5 m long. Each piece is 3/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

6. A ribbon is 1 1/3 m long. Each piece is 1/2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

7. A jug contains 2 L. Each full bottle needs 1 L. How many full bottles can be filled, and how much liquid remains?

8. A jug contains 1/4 L. Each full bottle needs 2/5 L. How many full bottles can be filled, and how much liquid remains?

9. A jug contains 1 L. Each full bottle needs 1/2 L. How many full bottles can be filled, and how much liquid remains?

10. A jug contains 1 1/2 L. Each full bottle needs 3/8 L. How many full bottles can be filled, and how much liquid remains?

Name _____ Date _____

Fraction Operations and Models

Lesson 11 Missing Factors and Quotients

Standards 6.NS.A.1

Learning target I can connect a fraction quotient to a missing factor.

Learn and Discuss

Division and multiplication are inverse operations. For T ÷ s = n, the related equation is s × n = T. Label whether the unknown is the total, the group size, or the number of groups.

Example 1 The equation 1/2 × n = 3/4 represents equally sized portions. Find n, write the related division equation, and check.
Solution n = 3/2; 3/4 ÷ 1/2 = 3/2. 3/4 ÷ 1/2 = 3/4 × 2 = 3/2. Check: 1/2 × 3/2 = 3/4.
Example 2 The equation 5/2 × n = 7/3 represents equally sized portions. Find n, write the related division equation, and check.
Solution n = 14/15; 7/3 ÷ 5/2 = 14/15. 7/3 ÷ 5/2 = 7/3 × 2/5 = 14/15. Check: 5/2 × 14/15 = 7/3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 11 Missing Factors and Quotients

Name _____ Show calculations, models, and units.

1. The equation 1/4 × n = 1/4 represents equally sized portions. Find n, write the related division equation, and check.

2. The equation 1/4 × n = 3/4 represents equally sized portions. Find n, write the related division equation, and check.

3. The equation 1/4 × n = 1/2 represents equally sized portions. Find n, write the related division equation, and check.

4. The equation 3/2 × n = 3 represents equally sized portions. Find n, write the related division equation, and check.

5. The equation 3/4 × n = 7/8 represents equally sized portions. Find n, write the related division equation, and check.

6. The equation 5/2 × n = 8/3 represents equally sized portions. Find n, write the related division equation, and check.

7. The equation 1/5 × n = 3/5 represents equally sized portions. Find n, write the related division equation, and check.

8. The equation 1/4 × n = 3/5 represents equally sized portions. Find n, write the related division equation, and check.

9. The equation 1 × n = 1/8 represents equally sized portions. Find n, write the related division equation, and check.

10. The equation 1/2 × n = 1/8 represents equally sized portions. Find n, write the related division equation, and check.

Name _____ Date _____

Fraction Operations and Models

Lesson 12 Explaining Fraction Division

Standards 6.NS.A.1

Learning target I can divide fractions and check using multiplication.

Learn and Discuss

If (a/b) ÷ (c/d) = q, then (c/d) × q = a/b. Multiplying by d/c undoes multiplying by c/d, so divide by a nonzero fraction by multiplying by its reciprocal. Simplify the product.

Example 1 Calculate 1/2 ÷ 1/4. Simplify.
Solution 2. 1/2 ÷ 1/4 = 1/2 × 4 = 2.
Example 2 Calculate 2 ÷ 3/5. Simplify and explain why your answer is reasonable.
Solution 10/3. 2 ÷ 3/5 = 2 × 5/3 = 10/3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

Fraction Model 3/4 ÷ 1/4 = 3 groups



Eight equal pieces show eighths. Every two pieces make 1/4; the shaded 3/4 contains three groups.

Lesson 12 Explaining Fraction Division

Name _____ Show calculations, models, and units.

1. Calculate 1/2 ÷ 1/4. Simplify.

2. Calculate 1 ÷ 1/2. Simplify.

3. Calculate 1/2 ÷ 1/2. Simplify.

4. Calculate 7/6 ÷ 1. Simplify.

5. Calculate 2 ÷ 2. Simplify.

6. Calculate 3/8 ÷ 3/2. Simplify.

7. Calculate 2/5 ÷ 1/4. Simplify and explain why your answer is reasonable.

8. Calculate 4/3 ÷ 1/2. Simplify and explain why your answer is reasonable.

9. Calculate 1/2 ÷ 4/3. Simplify and explain why your answer is reasonable.

10. Calculate 2 ÷ 1/5. Simplify and explain why your answer is reasonable.

Name _____ Date _____

Fraction Operations and Models

Unit 2 Test

Standards assessed 6.NS.B.3, 6.NS.B.4a, 6.NS.B.2, 6.NS.A.1

Questions 1–4 review Unit 1 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 5 points per question; 100 points total.

1. [Review] Use the standard algorithm: 57.2 + 5.4. Show your regrouping or division steps.

2. [Review] Use the standard algorithm: 24.7 × 8.6. Show your regrouping or division steps.

3. [Review] Find the GCF of 6 and 9. Show factor pairs or prime factors.

4. [Review] Use long division: 3,190 ÷ 22. Show the algorithm and check.

5. [Current unit] Calculate 3/4 × 1/4. Simplify.

6. [Current unit] Calculate 1 1/2 × 1 1/2. Simplify.

7. [Current unit] Draw a bar partitioned into 12 equal parts. Shade 11 parts. Circle groups of 10 parts. Use the model to find 11/12 ÷ 5/6.

Name _____ Date _____

Fraction Operations and Models

Unit 2 Test

Standards assessed 6.NS.B.3, 6.NS.B.4a, 6.NS.B.2, 6.NS.A.1

8. [Current unit] Draw a bar partitioned into 4 equal parts. Shade 2 parts. Circle groups of 2 parts. Use the model to find 1/2 ÷ 1/2.

9. [Current unit] Calculate 7/8 ÷ 3/2. Simplify.

10. [Current unit] Calculate 1/2 ÷ 5/4. Simplify.

11. [Current unit] Calculate 3 ÷ 1 2/3. Simplify.

12. [Current unit] Calculate 5 ÷ 2 1/4. Simplify.

13. [Current unit] A ribbon is 2 m long. Each piece is 2 m. How many piece-lengths are in the ribbon? Include any fractional piece.

14. [Current unit] A jug contains 1/3 L. Each full bottle needs 4/5 L. How many full bottles can be filled, and how much liquid remains?

Name _____ Date _____

Fraction Operations and Models

Unit 2 Test

Standards assessed 6.NS.B.3, 6.NS.B.4a, 6.NS.B.2, 6.NS.A.1

15. [Current unit] The equation 1 × n = 7/8 represents equally sized portions. Find n, write the related division equation, and check.

16. [Current unit] Calculate 1/2 ÷ 1/3. Simplify and explain why your answer is reasonable.

17. [Current unit] Calculate 5/8 × 1/2. Simplify and explain why your answer is reasonable.

18. [Current unit] Calculate 1 1/2 × 2 1/2. Simplify and explain why your answer is reasonable.

19. [Current unit] Draw a bar partitioned into 6 equal parts. Shade 3 parts. Circle groups of 2 parts. Use the model to find 1/2 ÷ 1/3. Explain the partial group.

20. [Current unit] Draw a bar partitioned into 4 equal parts. Shade 4 parts. Circle groups of 1 parts. Use the model to find 1 ÷ 1/4. Explain the partial group.

Name _____ Date _____

Ratios and Measurement

Lesson 1 Ratio Language and Order

Standards 6.RP.A.1

Learning target I can describe a ratio in the order named.

Learn and Discuss

A ratio compares two quantities multiplicatively. In a:b, a names the first quantity and b names the second. Divide both terms by a common factor to simplify, while keeping the labels and order.

Example 1 A tray has 7 red tiles and 2 blue tiles. Write the red-to-blue ratio in simplest form.
Solution 7:2. Keep red first; divide 7:2 by 1.
Example 2 A tray has 40 red tiles and 25 blue tiles. Write the red-to-blue ratio in simplest form and complete: there are ___ times as many red as blue.
Solution 8:5; 8/5 times as many. Keep red first; divide 40:25 by 5.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Ratio Language and Order

Name _____ Show calculations, models, and units.

1. A tray has 2 red tiles and 5 blue tiles. Write the red-to-blue ratio in simplest form.

2. A tray has 7 red tiles and 3 blue tiles. Write the red-to-blue ratio in simplest form.

3. A tray has 2 red tiles and 6 blue tiles. Write the red-to-blue ratio in simplest form.

4. A tray has 10 red tiles and 25 blue tiles. Write the red-to-blue ratio in simplest form.

5. A tray has 20 red tiles and 24 blue tiles. Write the red-to-blue ratio in simplest form.

6. A tray has 14 red tiles and 4 blue tiles. Write the red-to-blue ratio in simplest form.

7. A tray has 18 red tiles and 12 blue tiles. Write the red-to-blue ratio in simplest form and complete: there are ___ times as many red as blue.

8. A tray has 16 red tiles and 6 blue tiles. Write the red-to-blue ratio in simplest form and complete: there are ___ times as many red as blue.

9. A tray has 40 red tiles and 35 blue tiles. Write the red-to-blue ratio in simplest form and complete: there are ___ times as many red as blue.

10. A tray has 12 red tiles and 24 blue tiles. Write the red-to-blue ratio in simplest form and complete: there are ___ times as many red as blue.

Name _____ Date _____

Ratios and Measurement

Lesson 2 Parts and the Whole

Standards 6.RP.A.1

Learning target I can distinguish part-to-part and part-to-whole comparisons.

Learn and Discuss

For a:b, the total is a+b equal parts. The first part is a/(a+b) of the total; a/b compares it to the second part. Write labels before choosing the denominator.

Example 1 A collection has 25 green and 10 yellow counters. Write the fraction that is green.
Solution 5/7. Total = 35; green fraction = 25/35 = 5/7.
Example 2 A collection has 12 green and 6 yellow counters. Write the fraction that is green and the green-to-yellow ratio in simplest form. Explain the different denominators.
Solution 2/3; 2 or 2:1; the whole includes both colors. Total = 18; green fraction = 12/18 = 2/3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Parts and the Whole

Name _____ Show calculations, models, and units.

1. A collection has 25 green and 15 yellow counters. Write the fraction that is green.

2. A collection has 8 green and 10 yellow counters. Write the fraction that is green.

3. A collection has 12 green and 18 yellow counters. Write the fraction that is green.

4. A collection has 10 green and 14 yellow counters. Write the fraction that is green.

5. A collection has 12 green and 20 yellow counters. Write the fraction that is green.

6. A collection has 35 green and 30 yellow counters. Write the fraction that is green.

7. A collection has 15 green and 20 yellow counters. Write the fraction that is green and the green-to-yellow ratio in simplest form. Explain the different denominators.

8. A collection has 15 green and 21 yellow counters. Write the fraction that is green and the green-to-yellow ratio in simplest form. Explain the different denominators.

9. A collection has 20 green and 35 yellow counters. Write the fraction that is green and the green-to-yellow ratio in simplest form. Explain the different denominators.

10. A collection has 18 green and 9 yellow counters. Write the fraction that is green and the green-to-yellow ratio in simplest form. Explain the different denominators.

Name _____ Date _____

Ratios and Measurement

Lesson 3 Tape Diagrams and Totals

Standards 6.RP.A.3a

Learning target I can use equal-size tape sections to solve a ratio problem.

Learn and Discuss

For a ratio a:b, draw a sections for one quantity and b sections for the other. A total covers a+b sections. Divide the total by a+b to find one section, then multiply by each part count.

Example 1 The ratio of oak trees to pine trees is 4:3. There are 35 trees altogether. Draw a tape diagram and find each count.
Solution 20 oaks and 15 pines. 7 equal sections total; each section is 35 ÷ 7 = 5.
Example 2 The ratio of oak trees to pine trees is 3:2. There are 15 trees altogether. Draw a tape diagram and find each count and the difference between the counts.
Solution 9 oaks and 6 pines; difference 3. 5 equal sections total; each section is 15 ÷ 5 = 3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 3 Tape Diagrams and Totals

Name _____ Show calculations, models, and units.

1. The ratio of oak trees to pine trees is 8:7. There are 60 trees altogether. Draw a tape diagram and find each count.

2. The ratio of oak trees to pine trees is 2:2. There are 8 trees altogether. Draw a tape diagram and find each count.

3. The ratio of oak trees to pine trees is 2:3. There are 15 trees altogether. Draw a tape diagram and find each count.

4. The ratio of oak trees to pine trees is 6:2. There are 32 trees altogether. Draw a tape diagram and find each count.

5. The ratio of oak trees to pine trees is 7:7. There are 28 trees altogether. Draw a tape diagram and find each count.

6. The ratio of oak trees to pine trees is 6:5. There are 66 trees altogether. Draw a tape diagram and find each count.

7. The ratio of oak trees to pine trees is 3:3. There are 12 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

8. The ratio of oak trees to pine trees is 4:4. There are 32 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

9. The ratio of oak trees to pine trees is 4:2. There are 18 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

10. The ratio of oak trees to pine trees is 4:5. There are 27 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

Name _____ Date _____

Ratios and Measurement

Lesson 4 Equivalent Ratio Tables

Standards 6.RP.A.3a

Learning target I can complete an equivalent-ratio table.

Learn and Discuss

Multiply both values in a ratio by the same scale factor. Organize pairs in a table and check that every row compares the same quantities in the same order.

Example 1 A mix uses 2 cups of oats for 4 cups of seeds. Complete the table (oats, seeds): (2, 4), (4, ___), (4, ___).
Solution 8; 8. Multiply both parts by 2 and by 2.
Example 2 A mix uses 5 cups of oats for 7 cups of seeds. Complete the table (oats, seeds): (5, 7), (10, ___), (20, ___) and explain how you know the last two rows are equivalent.
Solution 14; 28. Multiply both parts by 2 and by 4.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Equivalent Ratio Tables

Name _____ Show calculations, models, and units.

1. A mix uses 7 cups of oats for 3 cups of seeds. Complete the table (oats, seeds): (7, 3), (14, ___), (21, ___).

2. A mix uses 2 cups of oats for 4 cups of seeds. Complete the table (oats, seeds): (2, 4), (4, ___), (4, ___).

3. A mix uses 2 cups of oats for 2 cups of seeds. Complete the table (oats, seeds): (2, 2), (4, ___), (8, ___).

4. A mix uses 5 cups of oats for 2 cups of seeds. Complete the table (oats, seeds): (5, 2), (10, ___), (25, ___).

5. A mix uses 5 cups of oats for 4 cups of seeds. Complete the table (oats, seeds): (5, 4), (10, ___), (30, ___).

6. A mix uses 8 cups of oats for 5 cups of seeds. Complete the table (oats, seeds): (8, 5), (16, ___), (40, ___).

7. A mix uses 7 cups of oats for 7 cups of seeds. Complete the table (oats, seeds): (7, 7), (14, ___), (42, ___) and explain how you know the last two rows are equivalent.

8. A mix uses 5 cups of oats for 5 cups of seeds. Complete the table (oats, seeds): (5, 5), (10, ___), (20, ___) and explain how you know the last two rows are equivalent.

9. A mix uses 6 cups of oats for 5 cups of seeds. Complete the table (oats, seeds): (6, 5), (12, ___), (24, ___) and explain how you know the last two rows are equivalent.

10. A mix uses 5 cups of oats for 6 cups of seeds. Complete the table (oats, seeds): (5, 6), (10, ___), (30, ___) and explain how you know the last two rows are equivalent.

Name _____ Date _____

Ratios and Measurement

Quiz 1

Standards assessed 6.NS.A.1, 6.RP.A.1, 6.RP.A.3a

Questions 1–1 review Unit 2 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Calculate 3 3/4 × 2 1/3. Simplify.

2. [Current unit] A tray has 12 red tiles and 10 blue tiles. Write the red-to-blue ratio in simplest form.

3. [Current unit] A collection has 30 green and 30 yellow counters. Write the fraction that is green.

4. [Current unit] The ratio of oak trees to pine trees is 7:3. There are 30 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

5. [Current unit] A mix uses 2 cups of oats for 7 cups of seeds. Complete the table (oats, seeds): (2, 7), (4, ___), (12, ___) and explain how you know the last two rows are equivalent.

Name _____ Date _____

Ratios and Measurement

Lesson 5 Missing Values in Ratio Tables

Standards 6.RP.A.3a

Learning target I can complete an equivalent-ratio table.

Learn and Discuss

Multiply both values in a ratio by the same scale factor. Organize pairs in a table and check that every row compares the same quantities in the same order.

Example 1 A mix uses 5 cups of oats for 7 cups of seeds. Complete the table (oats, seeds): (5, 7), (10, ___), (15, ___).
Solution 14; 21. Multiply both parts by 2 and by 3.
Example 2 A mix uses 5 cups of oats for 6 cups of seeds. Complete the table (oats, seeds): (5, 6), (10, ___), (20, ___) and explain how you know the last two rows are equivalent.
Solution 12; 24. Multiply both parts by 2 and by 4.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 5 Missing Values in Ratio Tables

Name _____ Show calculations, models, and units.

1. A mix uses 6 cups of oats for 7 cups of seeds. Complete the table (oats, seeds): (6, 7), (12, ___), (30, ___).

2. A mix uses 7 cups of oats for 3 cups of seeds. Complete the table (oats, seeds): (7, 3), (14, ___), (14, ___).

3. A mix uses 5 cups of oats for 2 cups of seeds. Complete the table (oats, seeds): (5, 2), (10, ___), (20, ___).

4. A mix uses 6 cups of oats for 6 cups of seeds. Complete the table (oats, seeds): (6, 6), (12, ___), (12, ___).

5. A mix uses 2 cups of oats for 7 cups of seeds. Complete the table (oats, seeds): (2, 7), (4, ___), (6, ___).

6. A mix uses 3 cups of oats for 7 cups of seeds. Complete the table (oats, seeds): (3, 7), (6, ___), (18, ___).

7. A mix uses 5 cups of oats for 5 cups of seeds. Complete the table (oats, seeds): (5, 5), (10, ___), (35, ___) and explain how you know the last two rows are equivalent.

8. A mix uses 7 cups of oats for 2 cups of seeds. Complete the table (oats, seeds): (7, 2), (14, ___), (35, ___) and explain how you know the last two rows are equivalent.

9. A mix uses 4 cups of oats for 5 cups of seeds. Complete the table (oats, seeds): (4, 5), (8, ___), (24, ___) and explain how you know the last two rows are equivalent.

10. A mix uses 8 cups of oats for 4 cups of seeds. Complete the table (oats, seeds): (8, 4), (16, ___), (56, ___) and explain how you know the last two rows are equivalent.

Name _____ Date _____

Ratios and Measurement

Lesson 6 Double Number Lines

Standards 6.RP.A.3a

Learning target I can represent a ratio on a double number line.

Learn and Discuss

Place zero on both parallel number lines. Align a known pair above and below one tick. Add equal jumps on each line so aligned values remain in the same ratio.

Example 1 Draw aligned number lines for 6 liters of paint covering 4 square meters. Mark 0, one batch, and 6 batches. How much area do 36 liters cover?
Solution 24 square meters; aligned pairs (0,0), (6,4), (36,24). 36 ÷ 6 = 6 batches; 6 × 4 = 24.
Example 2 Draw aligned number lines for 5 liters of paint covering 5 square meters. Mark 0, one batch, and 5 batches. How much area do 25 liters cover?
Solution 25 square meters; aligned pairs (0,0), (5,5), (25,25). 25 ÷ 5 = 5 batches; 5 × 5 = 25.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 6 Double Number Lines

Name _____ Show calculations, models, and units.

1. Draw aligned number lines for 7 liters of paint covering 7 square meters. Mark 0, one batch, and 3 batches. How much area do 21 liters cover?

2. Draw aligned number lines for 3 liters of paint covering 3 square meters. Mark 0, one batch, and 3 batches. How much area do 9 liters cover?

3. Draw aligned number lines for 2 liters of paint covering 7 square meters. Mark 0, one batch, and 4 batches. How much area do 8 liters cover?

4. Draw aligned number lines for 7 liters of paint covering 2 square meters. Mark 0, one batch, and 3 batches. How much area do 21 liters cover?

5. Draw aligned number lines for 3 liters of paint covering 6 square meters. Mark 0, one batch, and 6 batches. How much area do 18 liters cover?

6. Draw aligned number lines for 6 liters of paint covering 4 square meters. Mark 0, one batch, and 5 batches. How much area do 30 liters cover?

7. Draw aligned number lines for 7 liters of paint covering 7 square meters. Mark 0, one batch, and 4 batches. How much area do 28 liters cover?

8. Draw aligned number lines for 5 liters of paint covering 7 square meters. Mark 0, one batch, and 6 batches. How much area do 30 liters cover?

9. Draw aligned number lines for 3 liters of paint covering 3 square meters. Mark 0, one batch, and 4 batches. How much area do 12 liters cover?

10. Draw aligned number lines for 4 liters of paint covering 7 square meters. Mark 0, one batch, and 7 batches. How much area do 28 liters cover?

Name _____ Date _____

Ratios and Measurement

Lesson 7 Comparing Mixtures

Standards 6.RP.A.3a

Learning target I can compare ratios using a common quantity.

Learn and Discuss

Scale two ratios until one quantity matches, then compare the other quantity. The larger count alone is not enough: compare the amount per equal-sized batch or per one item.

Example 1 Mix A has 7 cups juice for 5 cups water. Mix B has 39 cups juice for 25 cups water. Which is stronger in juice? Show equivalent ratios.
Solution Mix B. For 25 cups water, A uses 35 cups juice; B uses 39. B has more juice per equal water amount.
Example 2 Mix A has 2 cups juice for 4 cups water. Mix B has 13 cups juice for 20 cups water. Which is stronger in juice? Show equivalent ratios.
Solution Mix B. For 20 cups water, A uses 10 cups juice; B uses 13. B has more juice per equal water amount.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 7 Comparing Mixtures

Name _____ Show calculations, models, and units.

1. Mix A has 6 cups juice for 3 cups water. Mix B has 37 cups juice for 18 cups water. Which is stronger in juice? Show equivalent ratios.

2. Mix A has 8 cups juice for 7 cups water. Mix B has 50 cups juice for 42 cups water. Which is stronger in juice? Show equivalent ratios.

3. Mix A has 6 cups juice for 6 cups water. Mix B has 16 cups juice for 12 cups water. Which is stronger in juice? Show equivalent ratios.

4. Mix A has 7 cups juice for 2 cups water. Mix B has 22 cups juice for 6 cups water. Which is stronger in juice? Show equivalent ratios.

5. Mix A has 4 cups juice for 2 cups water. Mix B has 23 cups juice for 10 cups water. Which is stronger in juice? Show equivalent ratios.

6. Mix A has 8 cups juice for 5 cups water. Mix B has 25 cups juice for 15 cups water. Which is stronger in juice? Show equivalent ratios.

7. Mix A has 6 cups juice for 4 cups water. Mix B has 32 cups juice for 20 cups water. Which is stronger in juice? Show equivalent ratios.

8. Mix A has 8 cups juice for 5 cups water. Mix B has 42 cups juice for 25 cups water. Which is stronger in juice? Show equivalent ratios.

9. Mix A has 5 cups juice for 5 cups water. Mix B has 28 cups juice for 25 cups water. Which is stronger in juice? Show equivalent ratios.

10. Mix A has 4 cups juice for 4 cups water. Mix B has 19 cups juice for 16 cups water. Which is stronger in juice? Show equivalent ratios.

Name _____ Date _____

Ratios and Measurement

Lesson 8 Plotting Ratio Pairs

Standards 6.RP.A.3a

Learning target I can plot equivalent-ratio pairs and explain a point.

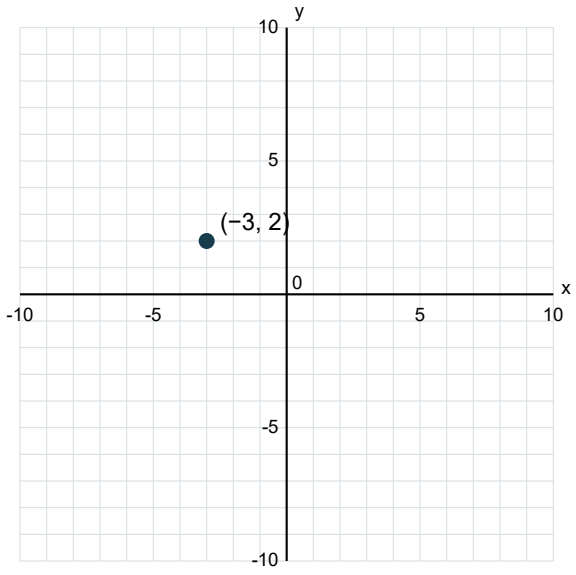
Learn and Discuss

Put the first quantity on the horizontal axis and the second on the vertical axis. Build a table, label units, and plot ordered pairs. A point (x,y) describes both quantities together.

Example 1 For every 8 tickets sold, a club earns $4. Make a table for 0, 1, 2, and 3 batches. Plot (tickets, dollars), label axes, and interpret (24, 12).
Solution (0,0), (8,4), (16,8), (24,12); 24 tickets earns $12. Scale both quantities by each batch count; plot horizontal tickets and vertical dollars.
Example 2 For every 7 tickets sold, a club earns $4. Make a table for 0, 1, 2, and 4 batches. Plot (tickets, dollars), label axes, and interpret (28, 16).
Solution (0,0), (7,4), (14,8), (28,16); 28 tickets earns $16. Scale both quantities by each batch count; plot horizontal tickets and vertical dollars.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.



Model a point (−3, 2) means move 3 left and 2 up from the origin. Label the axes and scale before plotting.

Lesson 8 Plotting Ratio Pairs

Name _____ Show calculations, models, and units.

1. For every 7 tickets sold, a club earns $4. Make a table for 0, 1, 2, and 2 batches. Plot (tickets, dollars), label axes, and interpret (14, 8).

2. For every 3 tickets sold, a club earns $3. Make a table for 0, 1, 2, and 5 batches. Plot (tickets, dollars), label axes, and interpret (15, 15).

3. For every 8 tickets sold, a club earns $3. Make a table for 0, 1, 2, and 2 batches. Plot (tickets, dollars), label axes, and interpret (16, 6).

4. For every 8 tickets sold, a club earns $7. Make a table for 0, 1, 2, and 4 batches. Plot (tickets, dollars), label axes, and interpret (32, 28).

5. For every 7 tickets sold, a club earns $7. Make a table for 0, 1, 2, and 2 batches. Plot (tickets, dollars), label axes, and interpret (14, 14).

6. For every 2 tickets sold, a club earns $2. Make a table for 0, 1, 2, and 4 batches. Plot (tickets, dollars), label axes, and interpret (8, 8).

7. For every 5 tickets sold, a club earns $5. Make a table for 0, 1, 2, and 5 batches. Plot (tickets, dollars), label axes, and interpret (25, 25).

8. For every 8 tickets sold, a club earns $7. Make a table for 0, 1, 2, and 7 batches. Plot (tickets, dollars), label axes, and interpret (56, 49).

9. For every 6 tickets sold, a club earns $6. Make a table for 0, 1, 2, and 6 batches. Plot (tickets, dollars), label axes, and interpret (36, 36).

10. For every 7 tickets sold, a club earns $4. Make a table for 0, 1, 2, and 6 batches. Plot (tickets, dollars), label axes, and interpret (42, 24).

Name _____ Date _____

Ratios and Measurement

Quiz 2

Standards assessed 6.NS.A.1, 6.RP.A.3a

Questions 1–1 review Unit 2 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Calculate 4 ÷ 1/2. Simplify.

2. [Current unit] A mix uses 2 cups of oats for 2 cups of seeds. Complete the table (oats, seeds): (2, 2), (4, ___), (4, ___).

3. [Current unit] Draw aligned number lines for 3 liters of paint covering 6 square meters. Mark 0, one batch, and 4 batches. How much area do 12 liters cover?

4. [Current unit] Mix A has 4 cups juice for 6 cups water. Mix B has 28 cups juice for 36 cups water. Which is stronger in juice? Show equivalent ratios.

5. [Current unit] For every 2 tickets sold, a club earns $3. Make a table for 0, 1, 2, and 6 batches. Plot (tickets, dollars), label axes, and interpret (12, 18).

Name _____ Date _____

Ratios and Measurement

Lesson 9 Ratios in Larger Batches

Standards 6.RP.A.3a

Learning target I can use equal-size tape sections to solve a ratio problem.

Learn and Discuss

For a ratio a:b, draw a sections for one quantity and b sections for the other. A total covers a+b sections. Divide the total by a+b to find one section, then multiply by each part count.

Example 1 The ratio of oak trees to pine trees is 8:6. There are 56 trees altogether. Draw a tape diagram and find each count.
Solution 32 oaks and 24 pines. 14 equal sections total; each section is 56 ÷ 14 = 4.
Example 2 The ratio of oak trees to pine trees is 6:4. There are 30 trees altogether. Draw a tape diagram and find each count and the difference between the counts.
Solution 18 oaks and 12 pines; difference 6. 10 equal sections total; each section is 30 ÷ 10 = 3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 9 Ratios in Larger Batches

Name _____ Show calculations, models, and units.

1. The ratio of oak trees to pine trees is 7:2. There are 18 trees altogether. Draw a tape diagram and find each count.

2. The ratio of oak trees to pine trees is 4:5. There are 45 trees altogether. Draw a tape diagram and find each count.

3. The ratio of oak trees to pine trees is 8:2. There are 60 trees altogether. Draw a tape diagram and find each count.

4. The ratio of oak trees to pine trees is 3:5. There are 24 trees altogether. Draw a tape diagram and find each count.

5. The ratio of oak trees to pine trees is 4:5. There are 27 trees altogether. Draw a tape diagram and find each count.

6. The ratio of oak trees to pine trees is 2:6. There are 32 trees altogether. Draw a tape diagram and find each count.

7. The ratio of oak trees to pine trees is 5:4. There are 45 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

8. The ratio of oak trees to pine trees is 8:6. There are 56 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

9. The ratio of oak trees to pine trees is 5:2. There are 28 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

10. The ratio of oak trees to pine trees is 2:7. There are 54 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

Name _____ Date _____

Ratios and Measurement

Lesson 10 Customary and Metric Conversions

Standards 6.RP.A.3d

Learning target I can convert measurements using equivalent ratios.

Learn and Discuss

Write an equality such as 1 foot = 12 inches. Multiply to change larger units into smaller units; divide for the reverse. A conversion factor is a ratio equal to 1, so the amount stays the same.

Example 1 Convert 2 yards to feet. Show the conversion ratio.
Solution 6 feet. 2 × 3 = 6. Smaller units require more units for the same amount.
Example 2 Convert 12 feet to yards. Show the conversion ratio.
Solution 4 yards. 12 ÷ 3 = 4; 1 yards = 3 feet.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Customary and Metric Conversions

Name _____ Show calculations, models, and units.

1. Convert 6 hours to minutes. Show the conversion ratio.

2. Convert 5 liters to milliliters. Show the conversion ratio.

3. Convert 8 feet to inches. Show the conversion ratio.

4. Convert 600 centimeters to meters. Show the conversion ratio.

5. Convert 2 liters to milliliters. Show the conversion ratio.

6. Convert 4000 milliliters to liters. Show the conversion ratio.

7. Convert 5/2 meters to centimeters. Show the conversion ratio and explain why the numerical value grows.

8. Convert 15/2 feet to yards. Show the conversion ratio.

9. Convert 2 hours to minutes. Show the conversion ratio and explain why the numerical value grows.

10. Convert 42 inches to feet. Show the conversion ratio.

Name _____ Date _____

Ratios and Measurement

Lesson 11 Conversions with Fractional Amounts

Standards 6.RP.A.3d

Learning target I can convert measurements using equivalent ratios.

Learn and Discuss

Write an equality such as 1 foot = 12 inches. Multiply to change larger units into smaller units; divide for the reverse. A conversion factor is a ratio equal to 1, so the amount stays the same.

Example 1 Convert 7 meters to centimeters. Show the conversion ratio.
Solution 700 centimeters. 7 × 100 = 700. Smaller units require more units for the same amount.
Example 2 Convert 210 minutes to hours. Show the conversion ratio.
Solution 7/2 hours. 210 ÷ 60 = 7/2; 1 hours = 60 minutes.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 11 Conversions with Fractional Amounts

Name _____ Show calculations, models, and units.

1. Convert 6 meters to centimeters. Show the conversion ratio.

2. Convert 2 hours to minutes. Show the conversion ratio.

3. Convert 3 liters to milliliters. Show the conversion ratio.

4. Convert 3000 milliliters to liters. Show the conversion ratio.

5. Convert 7 meters to centimeters. Show the conversion ratio.

6. Convert 800 centimeters to meters. Show the conversion ratio.

7. Convert 1 meters to centimeters. Show the conversion ratio and explain why the numerical value grows.

8. Convert 21/2 feet to yards. Show the conversion ratio.

9. Convert 4 liters to milliliters. Show the conversion ratio and explain why the numerical value grows.

10. Convert 250 centimeters to meters. Show the conversion ratio.

Name _____ Date _____

Ratios and Measurement

Lesson 12 Explaining Conversion Ratios

Standards 6.RP.A.3d

Learning target I can convert measurements using equivalent ratios.

Learn and Discuss

Write an equality such as 1 foot = 12 inches. Multiply to change larger units into smaller units; divide for the reverse. A conversion factor is a ratio equal to 1, so the amount stays the same.

Example 1 Convert 4 hours to minutes. Show the conversion ratio.
Solution 240 minutes. 4 × 60 = 240. Smaller units require more units for the same amount.
Example 2 Convert 400 centimeters to meters. Show the conversion ratio.
Solution 4 meters. 400 ÷ 100 = 4; 1 meters = 100 centimeters.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 12 Explaining Conversion Ratios

Name _____ Show calculations, models, and units.

1. Convert 7 feet to inches. Show the conversion ratio.

2. Convert 7 liters to milliliters. Show the conversion ratio.

3. Convert 2 yards to feet. Show the conversion ratio.

4. Convert 180 minutes to hours. Show the conversion ratio.

5. Convert 4 hours to minutes. Show the conversion ratio.

6. Convert 2000 milliliters to liters. Show the conversion ratio.

7. Convert 7/2 feet to inches. Show the conversion ratio and explain why the numerical value grows.

8. Convert 120 minutes to hours. Show the conversion ratio.

9. Convert 1 yards to feet. Show the conversion ratio and explain why the numerical value grows.

10. Convert 150 centimeters to meters. Show the conversion ratio.

Name _____ Date _____

Ratios and Measurement

Unit 3 Test

Standards assessed 6.NS.A.1, 6.RP.A.1, 6.RP.A.3a, 6.RP.A.3d

Questions 1–4 review Unit 2 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 5 points per question; 100 points total.

1. [Review] Draw a bar partitioned into 10 equal parts. Shade 9 parts. Circle groups of 9 parts. Use the model to find 9/10 ÷ 9/10.

2. [Review] Calculate 1/2 ÷ 1/2. Simplify.

3. [Review] A ribbon is 3/4 m long. Each piece is 1/4 m. How many piece-lengths are in the ribbon? Include any fractional piece.

4. [Review] Calculate 2 ÷ 1/8. Simplify.

5. [Current unit] A tray has 4 red tiles and 5 blue tiles. Write the red-to-blue ratio in simplest form.

6. [Current unit] A collection has 18 green and 6 yellow counters. Write the fraction that is green.

7. [Current unit] The ratio of oak trees to pine trees is 5:4. There are 45 trees altogether. Draw a tape diagram and find each count.

Name _____ Date _____

Ratios and Measurement

Unit 3 Test

Standards assessed 6.NS.A.1, 6.RP.A.1, 6.RP.A.3a, 6.RP.A.3d

8. [Current unit] A mix uses 5 cups of oats for 6 cups of seeds. Complete the table (oats, seeds): (5, 6), (10, ___), (10, ___).

9. [Current unit] A mix uses 2 cups of oats for 5 cups of seeds. Complete the table (oats, seeds): (2, 5), (4, ___), (10, ___).

10. [Current unit] Draw aligned number lines for 3 liters of paint covering 2 square meters. Mark 0, one batch, and 3 batches. How much area do 9 liters cover?

11. [Current unit] Mix A has 6 cups juice for 5 cups water. Mix B has 34 cups juice for 25 cups water. Which is stronger in juice? Show equivalent ratios.

12. [Current unit] For every 5 tickets sold, a club earns $4. Make a table for 0, 1, 2, and 6 batches. Plot (tickets, dollars), label axes, and interpret (30, 24).

13. [Current unit] The ratio of oak trees to pine trees is 6:3. There are 18 trees altogether. Draw a tape diagram and find each count.

14. [Current unit] Convert 3/2 yards to feet. Show the conversion ratio and explain why the numerical value grows.

Name _____ Date _____

Ratios and Measurement

Unit 3 Test

Standards assessed 6.NS.A.1, 6.RP.A.1, 6.RP.A.3a, 6.RP.A.3d

15. [Current unit] Convert 3/2 meters to centimeters. Show the conversion ratio and explain why the numerical value grows.

16. [Current unit] Convert 60 minutes to hours. Show the conversion ratio.

17. [Current unit] A tray has 14 red tiles and 8 blue tiles. Write the red-to-blue ratio in simplest form and complete: there are ___ times as many red as blue.

18. [Current unit] A collection has 12 green and 24 yellow counters. Write the fraction that is green and the green-to-yellow ratio in simplest form. Explain the different denominators.

19. [Current unit] The ratio of oak trees to pine trees is 6:2. There are 24 trees altogether. Draw a tape diagram and find each count and the difference between the counts.

20. [Current unit] A mix uses 2 cups of oats for 4 cups of seeds. Complete the table (oats, seeds): (2, 4), (4, ___), (12, ___) and explain how you know the last two rows are equivalent.

Name _____ Date _____

Rates and Percents

Lesson 1 Unit Rates with Labels

Standards 6.RP.A.2, 6.RP.A.3b

Learning target I can find a unit rate and explain its units.

Learn and Discuss

A unit rate compares an amount with one unit of another quantity. Divide the first quantity by the second. Write the units, such as dollars per notebook, so you know what the quotient means.

Example 1 7 identical notebooks cost $28. Find the cost per notebook.
Solution $4 per notebook. Unit rate = 28 ÷ 7 = 4 dollars per notebook.
Example 2 3 identical notebooks cost $10.5. Find the cost per notebook and the cost of 6 notebooks at this rate.
Solution $3.5 per notebook; $21. Unit rate = 10.5 ÷ 3 = 3.5 dollars per notebook.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Unit Rates with Labels

Name _____ Show calculations, models, and units.

1. 4 identical notebooks cost $28. Find the cost per notebook.

2. 5 identical notebooks cost $10. Find the cost per notebook.

3. 5 identical notebooks cost $40. Find the cost per notebook.

4. 4 identical notebooks cost $24. Find the cost per notebook.

5. 7 identical notebooks cost $28. Find the cost per notebook.

6. 3 identical notebooks cost $12. Find the cost per notebook.

7. 5 identical notebooks cost $5. Find the cost per notebook and the cost of 8 notebooks at this rate.

8. 2 identical notebooks cost $8. Find the cost per notebook and the cost of 5 notebooks at this rate.

9. 4 identical notebooks cost $14. Find the cost per notebook and the cost of 7 notebooks at this rate.

10. 4 identical notebooks cost $16. Find the cost per notebook and the cost of 7 notebooks at this rate.

Name _____ Date _____

Rates and Percents

Lesson 2 Using a Unit Rate

Standards 6.RP.A.2, 6.RP.A.3b

Learning target I can find a unit rate and explain its units.

Learn and Discuss

A unit rate compares an amount with one unit of another quantity. Divide the first quantity by the second. Write the units, such as dollars per notebook, so you know what the quotient means.

Example 1 4 identical notebooks cost $20. Find the cost per notebook.
Solution $5 per notebook. Unit rate = 20 ÷ 4 = 5 dollars per notebook.
Example 2 2 identical notebooks cost $7. Find the cost per notebook and the cost of 5 notebooks at this rate.
Solution $3.5 per notebook; $17.5. Unit rate = 7 ÷ 2 = 3.5 dollars per notebook.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Using a Unit Rate

Name _____ Show calculations, models, and units.

1. 4 identical notebooks cost $32. Find the cost per notebook.

2. 4 identical notebooks cost $8. Find the cost per notebook.

3. 6 identical notebooks cost $30. Find the cost per notebook.

4. 6 identical notebooks cost $42. Find the cost per notebook.

5. 2 identical notebooks cost $4. Find the cost per notebook.

6. 3 identical notebooks cost $15. Find the cost per notebook.

7. 7 identical notebooks cost $24.5. Find the cost per notebook and the cost of 10 notebooks at this rate.

8. 4 identical notebooks cost $4. Find the cost per notebook and the cost of 7 notebooks at this rate.

9. 4 identical notebooks cost $10. Find the cost per notebook and the cost of 7 notebooks at this rate.

10. 5 identical notebooks cost $20. Find the cost per notebook and the cost of 8 notebooks at this rate.

Name _____ Date _____

Rates and Percents

Lesson 3 Constant Speed

Standards 6.RP.A.3b

Learning target I can solve constant-speed problems using a rate per hour.

Learn and Discuss

At a constant speed, distance = speed × time. Divide distance by time to find speed, or distance by speed to find time. Keep units consistent before calculating.

Example 1 A bus travels at 40 km/h. How long does 200 km take?
Solution 5 hours. Time = distance ÷ speed = 200 ÷ 40 = 5.
Example 2 A bus travels at 40 km/h. How long does 40 km take?
Solution 1 hours. Time = distance ÷ speed = 40 ÷ 40 = 1.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 3 Constant Speed

Name _____ Show calculations, models, and units.

1. A cyclist travels 80 km in 2 hours at constant speed. Find the speed.

2. A bus travels at 20 km/h. How long does 120 km take?

3. A cyclist travels 100 km in 5 hours at constant speed. Find the speed.

4. A bus travels at 10 km/h. How long does 40 km take?

5. A cyclist travels 245 km in 7 hours at constant speed. Find the speed.

6. A bus travels at 40 km/h. How long does 200 km take?

7. A cyclist travels 30 km in 3 hours at constant speed. Find the speed and the distance in 2 hours.

8. A bus travels at 40 km/h. How long does 60 km take?

9. A cyclist travels 125/2 km in 5/2 hours at constant speed. Find the speed and the distance in 4 hours.

10. A bus travels at 35 km/h. How long does 245/2 km take?

Name _____ Date _____

Rates and Percents

Lesson 4 Distance and Time

Standards 6.RP.A.3b

Learning target I can solve constant-speed problems using a rate per hour.

Learn and Discuss

At a constant speed, distance = speed × time. Divide distance by time to find speed, or distance by speed to find time. Keep units consistent before calculating.

Example 1 A bus travels at 15 km/h. How long does 90 km take?
Solution 6 hours. Time = distance ÷ speed = 90 ÷ 15 = 6.
Example 2 A bus travels at 25 km/h. How long does 175/2 km take?
Solution 7/2 hours. Time = distance ÷ speed = 175/2 ÷ 25 = 7/2.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Distance and Time

Name _____ Show calculations, models, and units.

1. A cyclist travels 120 km in 6 hours at constant speed. Find the speed.

2. A bus travels at 40 km/h. How long does 120 km take?

3. A cyclist travels 150 km in 6 hours at constant speed. Find the speed.

4. A bus travels at 10 km/h. How long does 60 km take?

5. A cyclist travels 240 km in 6 hours at constant speed. Find the speed.

6. A bus travels at 30 km/h. How long does 120 km take?

7. A cyclist travels 25 km in 5/2 hours at constant speed. Find the speed and the distance in 4 hours.

8. A bus travels at 35 km/h. How long does 70 km take?

9. A cyclist travels 20 km in 1 hours at constant speed. Find the speed and the distance in 2 hours.

10. A bus travels at 25 km/h. How long does 75/2 km take?

Name _____ Date _____

Rates and Percents

Quiz 1

Standards assessed 6.RP.A.1, 6.RP.A.2, 6.RP.A.3b

Questions 1–1 review Unit 3 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] A collection has 6 green and 21 yellow counters. Write the fraction that is green.

2. [Current unit] 3 identical notebooks cost $6. Find the cost per notebook.

3. [Current unit] 2 identical notebooks cost $16. Find the cost per notebook.

4. [Current unit] A bus travels at 20 km/h. How long does 20 km take?

5. [Current unit] A bus travels at 15 km/h. How long does 15 km take?

Name _____ Date _____

Rates and Percents

Lesson 5 Finding Unit Prices

Standards 6.RP.A.3b

Learning target I can compare unit prices to find the better buy.

Learn and Discuss

Divide total cost by the number of items or units. Compare costs for exactly one of the same unit. A lower package price does not always give a lower unit price.

Example 1 Pack A has 4 markers for $24; Pack B has 8 markers for $52. Find each unit price and the better buy.
Solution A $6/marker; B $6.5/marker; A is cheaper. Divide each price by its marker count; compare 6 with 6.5.
Example 2 Pack A has 6 markers for $6; Pack B has 12 markers for $18. Find each unit price and the better buy. How much would 72 markers cost using each pack size?
Solution A $1/marker; B $1.5/marker; A is cheaper; A $72, B $108. Divide each price by its marker count; compare 1 with 1.5.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 5 Finding Unit Prices

Name _____ Show calculations, models, and units.

1. Pack A has 5 markers for $15; Pack B has 8 markers for $28. Find each unit price and the better buy.

2. Pack A has 7 markers for $14; Pack B has 10 markers for $25. Find each unit price and the better buy.

3. Pack A has 7 markers for $42; Pack B has 12 markers for $78. Find each unit price and the better buy.

4. Pack A has 5 markers for $10; Pack B has 8 markers for $20. Find each unit price and the better buy.

5. Pack A has 3 markers for $10.5; Pack B has 9 markers for $36. Find each unit price and the better buy.

6. Pack A has 6 markers for $15; Pack B has 10 markers for $30. Find each unit price and the better buy.

7. Pack A has 2 markers for $5; Pack B has 6 markers for $18. Find each unit price and the better buy. How much would 12 markers cost using each pack size?

8. Pack A has 7 markers for $17.5; Pack B has 13 markers for $39. Find each unit price and the better buy. How much would 91 markers cost using each pack size?

9. Pack A has 7 markers for $28; Pack B has 10 markers for $45. Find each unit price and the better buy. How much would 70 markers cost using each pack size?

10. Pack A has 3 markers for $7.5; Pack B has 8 markers for $24. Find each unit price and the better buy. How much would 24 markers cost using each pack size?

Name _____ Date _____

Rates and Percents

Lesson 6 Comparing Package Sizes

Standards 6.RP.A.3b

Learning target I can compare unit prices to find the better buy.

Learn and Discuss

Divide total cost by the number of items or units. Compare costs for exactly one of the same unit. A lower package price does not always give a lower unit price.

Example 1 Pack A has 7 markers for $14; Pack B has 13 markers for $32.5. Find each unit price and the better buy.
Solution A $2/marker; B $2.5/marker; A is cheaper. Divide each price by its marker count; compare 2 with 2.5.
Example 2 Pack A has 6 markers for $12; Pack B has 8 markers for $20. Find each unit price and the better buy. How much would 48 markers cost using each pack size?
Solution A $2/marker; B $2.5/marker; A is cheaper; A $96, B $120. Divide each price by its marker count; compare 2 with 2.5.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 6 Comparing Package Sizes

Name _____ Show calculations, models, and units.

1. Pack A has 7 markers for $21; Pack B has 13 markers for $45.5. Find each unit price and the better buy.

2. Pack A has 2 markers for $14; Pack B has 7 markers for $52.5. Find each unit price and the better buy.

3. Pack A has 3 markers for $12; Pack B has 8 markers for $36. Find each unit price and the better buy.

4. Pack A has 6 markers for $18; Pack B has 12 markers for $42. Find each unit price and the better buy.

5. Pack A has 4 markers for $6; Pack B has 7 markers for $14. Find each unit price and the better buy.

6. Pack A has 5 markers for $20; Pack B has 9 markers for $40.5. Find each unit price and the better buy.

7. Pack A has 3 markers for $4.5; Pack B has 9 markers for $18. Find each unit price and the better buy. How much would 27 markers cost using each pack size?

8. Pack A has 7 markers for $24.5; Pack B has 12 markers for $48. Find each unit price and the better buy. How much would 84 markers cost using each pack size?

9. Pack A has 3 markers for $9; Pack B has 6 markers for $21. Find each unit price and the better buy. How much would 18 markers cost using each pack size?

10. Pack A has 3 markers for $12; Pack B has 9 markers for $40.5. Find each unit price and the better buy. How much would 27 markers cost using each pack size?

Name _____ Date _____

Rates and Percents

Lesson 7 Percents Fractions and Decimals

Standards 6.RP.A.3c

Learning target I can connect a percent with a fraction out of 100 and a decimal.

Learn and Discuss

Percent means per 100. Write p% as p/100, simplify the fraction, and divide by 100 to write a decimal. To turn a decimal into a percent, multiply by 100.

Example 1 Write 50% as a simplified fraction and decimal.
Solution 1/2; 0.5. 50% = 50/100 = 1/2; divide by 100 for 0.5.
Example 2 Write 125% as a simplified fraction and decimal. Explain why the decimal can be greater than 1.
Solution 5/4; 1.25. 125% = 125/100 = 5/4; divide by 100 for 1.25.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 7 Percents Fractions and Decimals

Name _____ Show calculations, models, and units.

1. Write 10% as a simplified fraction and decimal.

2. Write 25% as a simplified fraction and decimal.

3. Write 50% as a simplified fraction and decimal.

4. Write 20% as a simplified fraction and decimal.

5. Write 12% as a simplified fraction and decimal.

6. Write 60% as a simplified fraction and decimal.

7. Write 40% as a simplified fraction and decimal.

8. Write 125% as a simplified fraction and decimal. Explain why the decimal can be greater than 1.

9. Write 75% as a simplified fraction and decimal.

10. Write 5% as a simplified fraction and decimal.

Name _____ Date _____

Rates and Percents

Lesson 8 Finding the Percent Part

Standards 6.RP.A.3c

Learning target I can find the part when I know the percent and whole.

Learn and Discuss

Use part = (percent/100) × whole. You may also find 10%, 5%, or 1% and combine equal pieces. Label the part in the same units as the whole.

Example 1 Find 50% of 40.
Solution 20. 50/100 × 40 = 20.
Example 2 Find 15% of 220. Then explain a mental-math or fraction strategy that checks your answer.
Solution 33. 15/100 × 220 = 33.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 8 Finding the Percent Part

Name _____ Show calculations, models, and units.

1. Find 20% of 60.

2. Find 50% of 60.

3. Find 25% of 100.

4. Find 25% of 220.

5. Find 5% of 180.

6. Find 15% of 200.

7. Find 30% of 80. Then explain a mental-math or fraction strategy that checks your answer.

8. Find 5% of 40. Then explain a mental-math or fraction strategy that checks your answer.

9. Find 40% of 220. Then explain a mental-math or fraction strategy that checks your answer.

10. Find 60% of 240. Then explain a mental-math or fraction strategy that checks your answer.

Name _____ Date _____

Rates and Percents

Quiz 2

Standards assessed 6.RP.A.3a, 6.RP.A.3b, 6.RP.A.3c

Questions 1–1 review Unit 3 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] For every 2 tickets sold, a club earns $3. Make a table for 0, 1, 2, and 3 batches. Plot (tickets, dollars), label axes, and interpret (6, 9).

2. [Current unit] Pack A has 7 markers for $17.5; Pack B has 11 markers for $33. Find each unit price and the better buy.

3. [Current unit] Pack A has 4 markers for $6; Pack B has 9 markers for $18. Find each unit price and the better buy.

4. [Current unit] Write 15% as a simplified fraction and decimal.

5. [Current unit] Find 20% of 40. Then explain a mental-math or fraction strategy that checks your answer.

Name _____ Date _____

Rates and Percents

Lesson 9 Percent Parts in Context

Standards 6.RP.A.3c

Learning target I can find the part when I know the percent and whole.

Learn and Discuss

Use part = (percent/100) × whole. You may also find 10%, 5%, or 1% and combine equal pieces. Label the part in the same units as the whole.

Example 1 Find 25% of 60.
Solution 15. 25/100 × 60 = 15.
Example 2 Find 20% of 80. Then explain a mental-math or fraction strategy that checks your answer.
Solution 16. 20/100 × 80 = 16.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 9 Percent Parts in Context

Name _____ Show calculations, models, and units.

1. Find 20% of 120.

2. Find 20% of 160.

3. Find 20% of 100.

4. Find 60% of 140.

5. Find 40% of 40.

6. Find 5% of 100.

7. Find 20% of 240. Then explain a mental-math or fraction strategy that checks your answer.

8. Find 75% of 200. Then explain a mental-math or fraction strategy that checks your answer.

9. Find 20% of 120. Then explain a mental-math or fraction strategy that checks your answer.

10. Find 25% of 220. Then explain a mental-math or fraction strategy that checks your answer.

Name _____ Date _____

Rates and Percents

Lesson 10 Finding the Whole

Standards 6.RP.A.3c

Learning target I can find the whole when a part and percent are known.

Learn and Discuss

Write part = decimal rate × whole. Divide the part by the decimal rate to find the whole. Check by taking the stated percent of your answer.

Example 1 20% of a number is 8. Find the number and check.
Solution 40. Whole = 8 ÷ 1/5 = 40. Check 20% × 40 = 8.
Example 2 125% of a number is 50. Find the number and check.
Solution 40. Whole = 50 ÷ 5/4 = 40. Check 125% × 40 = 50.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Finding the Whole

Name _____ Show calculations, models, and units.

1. 20% of a number is 8. Find the number and check.

2. 10% of a number is 22. Find the number and check.

3. 50% of a number is 110. Find the number and check.

4. 30% of a number is 60. Find the number and check.

5. 15% of a number is 30. Find the number and check.

6. 25% of a number is 55. Find the number and check.

7. 9 students are 15% of a school’s enrollment. Find the enrollment.

8. 18 students are 30% of a school’s enrollment. Find the enrollment.

9. 12 students are 30% of a school’s enrollment. Find the enrollment.

10. 120 students are 60% of a school’s enrollment. Find the enrollment.

Name _____ Date _____

Rates and Percents

Lesson 11 Finding the Percent Rate

Standards 6.RP.A.3c

Learning target I can find the percent that one quantity is of another.

Learn and Discuss

Divide the part by the whole, then multiply by 100. Keep the same units in part and whole. The percent can be above 100 if the part is larger than the reference whole.

Example 1 40 is what percent of 200?
Solution 20%. 40 ÷ 200 × 100 = 20%; the reference whole is 200.
Example 2 200 is what percent of 160? State which quantity is the reference whole.
Solution 125%. 200 ÷ 160 × 100 = 125%; the reference whole is 160.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 11 Finding the Percent Rate

Name _____ Show calculations, models, and units.

1. 8 is what percent of 80?

2. 22 is what percent of 220?

3. 20 is what percent of 100?

4. 88 is what percent of 220?

5. 24 is what percent of 60?

6. 6 is what percent of 40?

7. 40 is what percent of 200? State which quantity is the reference whole.

8. 165 is what percent of 220? State which quantity is the reference whole.

9. 20 is what percent of 80? State which quantity is the reference whole.

10. 225 is what percent of 180? State which quantity is the reference whole.

Name _____ Date _____

Rates and Percents

Lesson 12 Choosing a Percent Strategy

Standards 6.RP.A.3c

Learning target I can identify the unknown in a percent problem and select a strategy.

Learn and Discuss

Read the requested quantity first and identify the relevant model. Use part = (percent/100) × whole. You may also find 10%, 5%, or 1% and combine equal pieces. Label the part in the same units as the whole. Explain why the units and the final value fit the situation.

Example 1 50% of a number is 90. Find the number and check.
Solution 180. Whole = 90 ÷ 1/2 = 180. Check 50% × 180 = 90.
Example 2 30 students are 75% of a school’s enrollment. Find the enrollment.
Solution 40. Whole = 30 ÷ 3/4 = 40. Check 75% × 40 = 30.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 12 Choosing a Percent Strategy

Name _____ Show calculations, models, and units.

1. Find 20% of 180.

2. 10% of a number is 12. Find the number and check.

3. 16 is what percent of 160?

4. Find 75% of 200.

5. 125% of a number is 200. Find the number and check.

6. 48/5 is what percent of 80?

7. Find 30% of 180. Then explain a mental-math or fraction strategy that checks your answer.

8. 9 students are 5% of a school’s enrollment. Find the enrollment.

9. 200 is what percent of 160? State which quantity is the reference whole.

10. Find 30% of 60. Then explain a mental-math or fraction strategy that checks your answer.

Name _____ Date _____

Rates and Percents

Unit 4 Test

Standards assessed 6.RP.A.3a, 6.RP.A.3d, 6.RP.A.2, 6.RP.A.3b, 6.RP.A.3c

Questions 1–4 review Unit 3 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 5 points per question; 100 points total.

1. [Review] The ratio of oak trees to pine trees is 7:4. There are 44 trees altogether. Draw a tape diagram and find each count.

2. [Review] Draw aligned number lines for 4 liters of paint covering 5 square meters. Mark 0, one batch, and 2 batches. How much area do 8 liters cover?

3. [Review] The ratio of oak trees to pine trees is 3:2. There are 15 trees altogether. Draw a tape diagram and find each count.

4. [Review] Convert 9 feet to yards. Show the conversion ratio.

5. [Current unit] 4 identical notebooks cost $16. Find the cost per notebook.

6. [Current unit] 5 identical notebooks cost $35. Find the cost per notebook.

7. [Current unit] A cyclist travels 90 km in 6 hours at constant speed. Find the speed.

Name _____ Date _____

Rates and Percents

Unit 4 Test

Standards assessed 6.RP.A.3a, 6.RP.A.3d, 6.RP.A.2, 6.RP.A.3b, 6.RP.A.3c

8. [Current unit] A bus travels at 35 km/h. How long does 105 km take?

9. [Current unit] Pack A has 7 markers for $28; Pack B has 9 markers for $40.5. Find each unit price and the better buy.

10. [Current unit] Pack A has 5 markers for $20; Pack B has 8 markers for $36. Find each unit price and the better buy.

11. [Current unit] Write 30% as a simplified fraction and decimal.

12. [Current unit] Find 75% of 220.

13. [Current unit] Find 5% of 240.

14. [Current unit] 60 students are 60% of a school’s enrollment. Find the enrollment.

Name _____ Date _____

Rates and Percents

Unit 4 Test

Standards assessed 6.RP.A.3a, 6.RP.A.3d, 6.RP.A.2, 6.RP.A.3b, 6.RP.A.3c

15. [Current unit] 16 is what percent of 40? State which quantity is the reference whole.

16. [Current unit] 44 students are 20% of a school’s enrollment. Find the enrollment.

17. [Current unit] 5 identical notebooks cost $17.5. Find the cost per notebook and the cost of 8 notebooks at this rate.

18. [Current unit] 3 identical notebooks cost $12. Find the cost per notebook and the cost of 6 notebooks at this rate.

19. [Current unit] A cyclist travels 40 km in 1 hours at constant speed. Find the speed and the distance in 5 hours.

20. [Current unit] A bus travels at 20 km/h. How long does 70 km take?

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 1 Signed Quantities and Zero

Standards 6.NS.C.5

Learning target I can use positive numbers, negative numbers, and zero in context.

Learn and Discuss

Choose a reference point for zero. Opposite directions or values use opposite signs: above sea level is positive and below sea level is negative. Zero means at the chosen reference, not always nothing.

Example 1 A marker is 35 m below sea level. Write its signed elevation and explain what elevation 0 means.
Solution -35 m; 0 means at sea level. Sea level is the reference. Below is negative and above is positive.
Example 2 A marker is 4 m below sea level. Write its signed elevation and explain what elevation 0 means. Write the elevation of the point equally far on the opposite side of sea level.
Solution -4 m; 0 means at sea level; opposite +4 m. Sea level is the reference. Below is negative and above is positive.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Signed Quantities and Zero

Name _____ Show calculations, models, and units.

1. A marker is 32 m above sea level. Write its signed elevation and explain what elevation 0 means.

2. A marker is 16 m below sea level. Write its signed elevation and explain what elevation 0 means.

3. A marker is 21 m above sea level. Write its signed elevation and explain what elevation 0 means.

4. A marker is 20 m below sea level. Write its signed elevation and explain what elevation 0 means.

5. A marker is 15 m above sea level. Write its signed elevation and explain what elevation 0 means.

6. A marker is 25 m below sea level. Write its signed elevation and explain what elevation 0 means.

7. A marker is 35 m above sea level. Write its signed elevation and explain what elevation 0 means. Write the elevation of the point equally far on the opposite side of sea level.

8. A marker is 20 m below sea level. Write its signed elevation and explain what elevation 0 means. Write the elevation of the point equally far on the opposite side of sea level.

9. A marker is 12 m above sea level. Write its signed elevation and explain what elevation 0 means. Write the elevation of the point equally far on the opposite side of sea level.

10. A marker is 42 m below sea level. Write its signed elevation and explain what elevation 0 means. Write the elevation of the point equally far on the opposite side of sea level.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 2 Opposites and Double Opposites

Standards 6.NS.C.6a

Learning target I can identify opposites and the opposite of an opposite.

Learn and Discuss

Opposites are equally far from zero on opposite sides of a number line. The opposite of 0 is 0. Reversing direction twice returns to the original number.

Example 1 Find the opposite of -7. Show both values on a number line.
Solution 7. -7 and 7 are each 7 units from 0 on opposite sides.
Example 2 Find the opposite of -3/4 and the opposite of that result. Locate all values on a number line.
Solution 3/4; opposite again -3/4. -3/4 and 3/4 are each 3/4 units from 0 on opposite sides.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Opposites and Double Opposites

Name _____ Show calculations, models, and units.

1. Find the opposite of -8. Show both values on a number line.

2. Find the opposite of -6. Show both values on a number line.

3. Find the opposite of -5. Show both values on a number line.

4. Find the opposite of -7/4 and the opposite of that result. Locate all values on a number line.

5. Find the opposite of -1 and the opposite of that result. Locate all values on a number line.

6. Find the opposite of -2 and the opposite of that result. Locate all values on a number line.

7. Find the opposite of -2/5 and the opposite of that result. Locate all values on a number line.

8. Find the opposite of -7 and the opposite of that result. Locate all values on a number line.

9. Find the opposite of -3 and the opposite of that result. Locate all values on a number line.

10. Find the opposite of -4/5 and the opposite of that result. Locate all values on a number line.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 3 Integers on Number Lines

Standards 6.NS.C.6c

Learning target I can locate integers and negative fractions on a number line.

Learn and Discuss

Mark zero and equally spaced whole-number ticks. Partition each interval into equal parts for the denominator. Negative values are left of zero on a horizontal line and below zero on a vertical line.

Example 1 Draw a horizontal or vertical number line. Plot and label -5, 0, and 2.
Solution -5 < 0 < 2; unit steps. Negative -5 is left of or below 0; 2 is right of or above 0. Use equal intervals.
Example 2 Draw a horizontal or vertical number line. Plot and label -7/3, 0, and 2/3. Name the step size of your scale and explain the placement.
Solution -7/3 < 0 < 2/3; use steps of 1/3. Negative -7/3 is left of or below 0; 2/3 is right of or above 0. Use equal intervals.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 3 Integers on Number Lines

Name _____ Show calculations, models, and units.

1. Draw a horizontal or vertical number line. Plot and label -8, 0, and 3.

2. Draw a horizontal or vertical number line. Plot and label -8, 0, and 2.

3. Draw a horizontal or vertical number line. Plot and label -4, 0, and 6.

4. Draw a horizontal or vertical number line. Plot and label -7/3, 0, and 1.

5. Draw a horizontal or vertical number line. Plot and label -4/5, 0, and 7/5.

6. Draw a horizontal or vertical number line. Plot and label -2, 0, and 5/2.

7. Draw a horizontal or vertical number line. Plot and label -7/3, 0, and 5/3. Name the step size of your scale and explain the placement.

8. Draw a horizontal or vertical number line. Plot and label -4/5, 0, and 2/5. Name the step size of your scale and explain the placement.

9. Draw a horizontal or vertical number line. Plot and label -3/4, 0, and 5/4. Name the step size of your scale and explain the placement.

10. Draw a horizontal or vertical number line. Plot and label -2/3, 0, and 1. Name the step size of your scale and explain the placement.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 4 Negative Fractions on Number Lines

Standards 6.NS.C.6c

Learning target I can locate integers and negative fractions on a number line.

Learn and Discuss

Mark zero and equally spaced whole-number ticks. Partition each interval into equal parts for the denominator. Negative values are left of zero on a horizontal line and below zero on a vertical line.

Example 1 Draw a horizontal or vertical number line. Plot and label -5, 0, and 2.
Solution -5 < 0 < 2; unit steps. Negative -5 is left of or below 0; 2 is right of or above 0. Use equal intervals.
Example 2 Draw a horizontal or vertical number line. Plot and label -7/3, 0, and 7/3. Name the step size of your scale and explain the placement.
Solution -7/3 < 0 < 7/3; use steps of 1/3. Negative -7/3 is left of or below 0; 7/3 is right of or above 0. Use equal intervals.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Negative Fractions on Number Lines

Name _____ Show calculations, models, and units.

1. Draw a horizontal or vertical number line. Plot and label -4, 0, and 4.

2. Draw a horizontal or vertical number line. Plot and label -2, 0, and 6.

3. Draw a horizontal or vertical number line. Plot and label -4, 0, and 2.

4. Draw a horizontal or vertical number line. Plot and label -1, 0, and 3/2.

5. Draw a horizontal or vertical number line. Plot and label -1, 0, and 7/5.

6. Draw a horizontal or vertical number line. Plot and label -1/5, 0, and 1/5.

7. Draw a horizontal or vertical number line. Plot and label -7/4, 0, and 3/4. Name the step size of your scale and explain the placement.

8. Draw a horizontal or vertical number line. Plot and label -5/4, 0, and 5/4. Name the step size of your scale and explain the placement.

9. Draw a horizontal or vertical number line. Plot and label -2, 0, and 3/2. Name the step size of your scale and explain the placement.

10. Draw a horizontal or vertical number line. Plot and label -5/3, 0, and 5/3. Name the step size of your scale and explain the placement.

Name _____ Date _____

Rational Numbers and Coordinates

Quiz 1

Standards assessed 6.RP.A.2, 6.RP.A.3b, 6.NS.C.5, 6.NS.C.6a, 6.NS.C.6c

Questions 1–1 review Unit 4 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] 2 identical notebooks cost $12. Find the cost per notebook.

2. [Current unit] A marker is 6 m below sea level. Write its signed elevation and explain what elevation 0 means.

3. [Current unit] Find the opposite of -8 and the opposite of that result. Locate all values on a number line.

4. [Current unit] Draw a horizontal or vertical number line. Plot and label -2, 0, and 7/4. Name the step size of your scale and explain the placement.

5. [Current unit] Draw a horizontal or vertical number line. Plot and label -4/5, 0, and 7/10. Name the step size of your scale and explain the placement.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 5 Comparing Negative Values

Standards 6.NS.C.7a, 6.NS.C.7b

Learning target I can order rational numbers using their positions.

Learn and Discuss

A number farther right is greater. Among negative numbers, the value closer to zero is greater. Use a common denominator or familiar benchmarks to compare negative fractions.

Example 1 Compare -8 ___ -4 using <, >, or =. Sketch a number line to justify.
Solution <. -8 < -4; greater numbers lie farther right.
Example 2 Temperatures are -1/2°C and -7/4°C. Write an inequality comparing them and explain which is warmer.
Solution -1/2 > -7/4; -1/2°C is warmer. The greater value is farther right on a number line, even when both are negative.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 5 Comparing Negative Values

Name _____ Show calculations, models, and units.

1. Compare -8 ___ -7 using <, >, or =. Sketch a number line to justify.

2. Compare -5 ___ -6 using <, >, or =. Sketch a number line to justify.

3. Compare -5 ___ -4 using <, >, or =. Sketch a number line to justify.

4. Compare -1 ___ -7/10 using <, >, or =. Sketch a number line to justify.

5. Compare -2 ___ -1 using <, >, or =. Sketch a number line to justify.

6. Compare -5/4 ___ -1 using <, >, or =. Sketch a number line to justify.

7. Temperatures are -3/10°C and -3/2°C. Write an inequality comparing them and explain which is warmer.

8. Temperatures are -4/5°C and -1°C. Write an inequality comparing them and explain which is warmer.

9. Temperatures are -6/5°C and -5/4°C. Write an inequality comparing them and explain which is warmer.

10. Temperatures are -7/2°C and -7/2°C. Write an inequality comparing them and explain which is warmer.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 6 Ordering Temperatures

Standards 6.NS.C.7a, 6.NS.C.7b

Learning target I can order rational numbers using their positions.

Learn and Discuss

A number farther right is greater. Among negative numbers, the value closer to zero is greater. Use a common denominator or familiar benchmarks to compare negative fractions.

Example 1 Compare -2 ___ -4 using <, >, or =. Sketch a number line to justify.
Solution >. -2 > -4; greater numbers lie farther right.
Example 2 Temperatures are -4°C and -2/3°C. Write an inequality comparing them and explain which is warmer.
Solution -4 < -2/3; -2/3°C is warmer. The greater value is farther right on a number line, even when both are negative.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 6 Ordering Temperatures

Name _____ Show calculations, models, and units.

1. Compare -8 ___ -2 using <, >, or =. Sketch a number line to justify.

2. Compare -6 ___ -5 using <, >, or =. Sketch a number line to justify.

3. Compare -3 ___ -6 using <, >, or =. Sketch a number line to justify.

4. Compare -7/4 ___ -5/4 using <, >, or =. Sketch a number line to justify.

5. Compare -3/10 ___ -3/5 using <, >, or =. Sketch a number line to justify.

6. Compare -2 ___ -7/3 using <, >, or =. Sketch a number line to justify.

7. Temperatures are -2°C and -2/5°C. Write an inequality comparing them and explain which is warmer.

8. Temperatures are -1°C and -2/5°C. Write an inequality comparing them and explain which is warmer.

9. Temperatures are -1°C and -7/4°C. Write an inequality comparing them and explain which is warmer.

10. Temperatures are -3/2°C and -2/5°C. Write an inequality comparing them and explain which is warmer.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 7 Absolute Value as Distance

Standards 6.NS.C.7c, 6.NS.C.7d

Learning target I can distinguish a number from its distance to zero.

Learn and Discuss

The absolute value |x| is the distance from x to zero, so it cannot be negative. A larger absolute value means farther from zero, but does not necessarily mean a greater number.

Example 1 Find |-28|. Explain the distance meaning.
Solution 28. -28 is 28 units from 0; distance is nonnegative.
Example 2 A diver is at -18 m and a bird is at 3 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.
Solution Diver: 18 m from sea level; bird has greater elevation. |-18| = 18 > |3| = 3, but -18 < 3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 7 Absolute Value as Distance

Name _____ Show calculations, models, and units.

1. Find |-16|. Explain the distance meaning.

2. Find |-35|. Explain the distance meaning.

3. Find |-6|. Explain the distance meaning.

4. Find |-3| and compare it with |3/2|.

5. Find |-6| and compare it with |3|.

6. Find |-8| and compare it with |4|.

7. A diver is at -21 m and a bird is at 7/2 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

8. A diver is at -14 m and a bird is at 2 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

9. A diver is at -16 m and a bird is at 4 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

10. A diver is at -25/2 m and a bird is at 5/2 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 8 Magnitude and Order

Standards 6.NS.C.7c, 6.NS.C.7d

Learning target I can distinguish a number from its distance to zero.

Learn and Discuss

The absolute value |x| is the distance from x to zero, so it cannot be negative. A larger absolute value means farther from zero, but does not necessarily mean a greater number.

Example 1 Find |-16|. Explain the distance meaning.
Solution 16. -16 is 16 units from 0; distance is nonnegative.
Example 2 A diver is at -21 m and a bird is at 7/2 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.
Solution Diver: 21 m from sea level; bird has greater elevation. |-21| = 21 > |7/2| = 7/2, but -21 < 7/2.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 8 Magnitude and Order

Name _____ Show calculations, models, and units.

1. Find |-12|. Explain the distance meaning.

2. Find |-8|. Explain the distance meaning.

3. Find |-21|. Explain the distance meaning.

4. Find |-8| and compare it with |2|.

5. Find |-14| and compare it with |2|.

6. Find |-12| and compare it with |4|.

7. A diver is at -12 m and a bird is at 4 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

8. A diver is at -5 m and a bird is at 1 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

9. A diver is at -7 m and a bird is at 7/2 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

10. A diver is at -28 m and a bird is at 4 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

Name _____ Date _____

Rational Numbers and Coordinates

Quiz 2

Standards assessed 6.RP.A.3c, 6.NS.C.7a, 6.NS.C.7b, 6.NS.C.7c, 6.NS.C.7d

Questions 1–1 review Unit 4 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Find 10% of 100.

2. [Current unit] Compare -2 ___ -6/5 using <, >, or =. Sketch a number line to justify.

3. [Current unit] Compare -1 ___ -4/3 using <, >, or =. Sketch a number line to justify.

4. [Current unit] A diver is at -4 m and a bird is at 1 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

5. [Current unit] A diver is at -6 m and a bird is at 3 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 9 Points in Four Quadrants

Standards 6.NS.C.6b, 6.NS.C.6c

Learning target I can plot ordered pairs in all four quadrants.

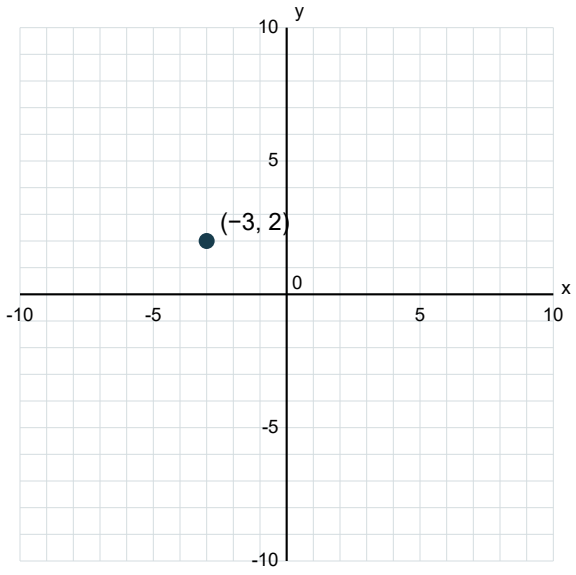
Learn and Discuss

Start at the origin. Move horizontally by x, then vertically by y. Quadrant signs are I (+,+), II (-,+), III (-,-), IV (+,-). A point on an axis belongs to no quadrant.

Example 1 Plot P(4, -6) on a coordinate plane and name its quadrant.
Solution Quadrant IV. Move 4 right, then 6 down.
Example 2 Plot P(4, -3) on a coordinate plane and name its quadrant. Then plot Q on the y-axis at the same height and name its coordinates.
Solution Quadrant IV; Q(0, -3). Move 4 right, then 3 down.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.



Model a point (−3, 2) means move 3 left and 2 up from the origin. Label the axes and scale before plotting.

Lesson 9 Points in Four Quadrants

Name _____ Show calculations, models, and units.

1. Plot P(-2, -3) on a coordinate plane and name its quadrant.

2. Plot P(7, -5) on a coordinate plane and name its quadrant.

3. Plot P(-7, 4) on a coordinate plane and name its quadrant.

4. Plot P(4, -2) on a coordinate plane and name its quadrant.

5. Plot P(-6, -4) on a coordinate plane and name its quadrant.

6. Plot P(5, 4) on a coordinate plane and name its quadrant.

7. Plot P(-7/2, -3/2) on a coordinate plane and name its quadrant. Then plot Q on the y-axis at the same height and name its coordinates.

8. Plot P(4, -7/2) on a coordinate plane and name its quadrant. Then plot Q on the y-axis at the same height and name its coordinates.

9. Plot P(-5/2, 5/2) on a coordinate plane and name its quadrant. Then plot Q on the y-axis at the same height and name its coordinates.

10. Plot P(7/2, -3) on a coordinate plane and name its quadrant. Then plot Q on the y-axis at the same height and name its coordinates.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 10 Reflections and Coordinate Signs

Standards 6.NS.C.6b

Learning target I can reflect points across an axis using signs.

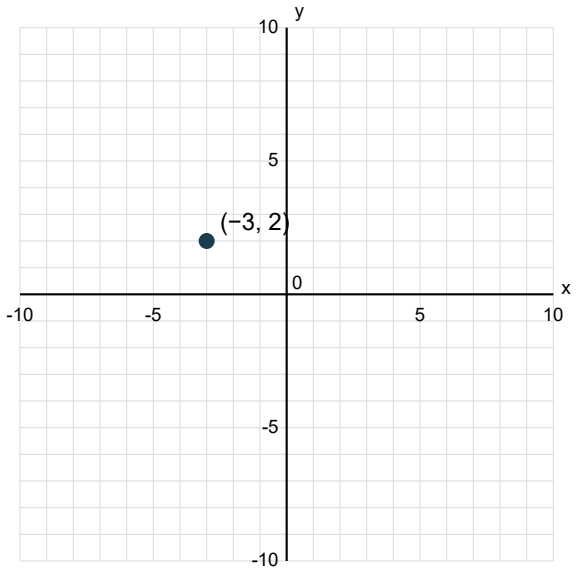
Learn and Discuss

Across the x-axis, keep x and reverse the sign of y. Across the y-axis, reverse x and keep y. Across both axes, reverse both signs. The reflected point stays the same distance from the axis.

Example 1 Plot (-7, -3), reflect it across y-axis, and give the reflected coordinates.
Solution (7, -3). Reverse the x sign: (7, -3).
Example 2 Plot (-4, -7), reflect it across both axes, and give the reflected coordinates.
Solution (4, 7). Reverse both signs: (4, 7).

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.



Model a point (−3, 2) means move 3 left and 2 up from the origin. Label the axes and scale before plotting.

Lesson 10 Reflections and Coordinate Signs

Name _____ Show calculations, models, and units.

1. Plot (-8, 6), reflect it across x-axis, and give the reflected coordinates.

2. Plot (-2, -5), reflect it across y-axis, and give the reflected coordinates.

3. Plot (-5, 6), reflect it across x-axis, and give the reflected coordinates.

4. Plot (-4, -2), reflect it across y-axis, and give the reflected coordinates.

5. Plot (-7, 4), reflect it across x-axis, and give the reflected coordinates.

6. Plot (-2, -7), reflect it across y-axis, and give the reflected coordinates.

7. Plot (-2, 3), reflect it across both axes, and give the reflected coordinates.

8. Plot (-7, -3), reflect it across both axes, and give the reflected coordinates.

9. Plot (-6, 2), reflect it across both axes, and give the reflected coordinates.

10. Plot (-8, -7), reflect it across both axes, and give the reflected coordinates.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 11 Horizontal and Vertical Distances

Standards 6.NS.C.8

Learning target I can graph points and find horizontal or vertical distance.

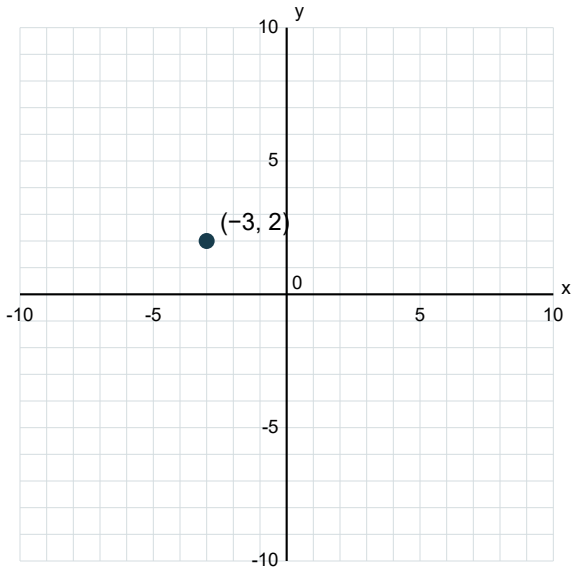
Learn and Discuss

Plot both points. If x-coordinates match, count the vertical units; if y-coordinates match, count horizontal units. On opposite sides of zero, add distances to zero. On the same side, subtract magnitudes.

Example 1 Plot (-6, 2) and (-8, 2). Find their distance.
Solution 2 units. Only one coordinate changes. Same side of 0: subtract magnitudes to get 2.
Example 2 Plot (-2, 4) and (2, 4). Find their distance. Explain why adding magnitudes works or does not work for these points.
Solution 4 units. Only one coordinate changes. Opposite sides of 0: 2 + 2 = 4.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.



Model a point (−3, 2) means move 3 left and 2 up from the origin. Label the axes and scale before plotting.

Lesson 11 Horizontal and Vertical Distances

Name _____ Show calculations, models, and units.

1. Plot (2, -3) and (2, -5). Find their distance.

2. Plot (-7, 3) and (-10, 3). Find their distance.

3. Plot (5, -4) and (5, -9). Find their distance.

4. Plot (-6, 3) and (7, 3). Find their distance.

5. Plot (5, -2) and (5, 6). Find their distance.

6. Plot (-3, 2) and (2, 2). Find their distance.

7. Plot (2, -8) and (2, 2). Find their distance. Explain why adding magnitudes works or does not work for these points.

8. Plot (-7, 5) and (3, 5). Find their distance. Explain why adding magnitudes works or does not work for these points.

9. Plot (6, -6) and (6, 4). Find their distance. Explain why adding magnitudes works or does not work for these points.

10. Plot (-8, 3) and (5, 3). Find their distance. Explain why adding magnitudes works or does not work for these points.

Name _____ Date _____

Rational Numbers and Coordinates

Lesson 12 Distances Across the Axes

Standards 6.NS.C.8

Learning target I can graph points and find horizontal or vertical distance.

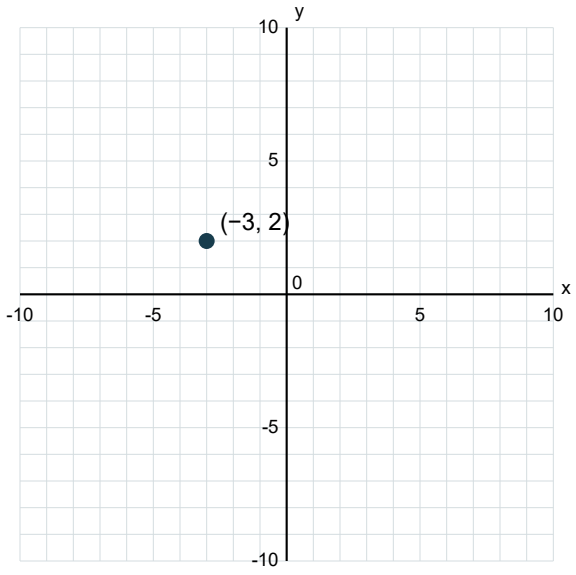
Learn and Discuss

Plot both points. If x-coordinates match, count the vertical units; if y-coordinates match, count horizontal units. On opposite sides of zero, add distances to zero. On the same side, subtract magnitudes.

Example 1 Plot (-8, 5) and (-13, 5). Find their distance.
Solution 5 units. Only one coordinate changes. Same side of 0: subtract magnitudes to get 5.
Example 2 Plot (-8, 4) and (7, 4). Find their distance. Explain why adding magnitudes works or does not work for these points.
Solution 15 units. Only one coordinate changes. Opposite sides of 0: 8 + 7 = 15.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.



Model a point (−3, 2) means move 3 left and 2 up from the origin. Label the axes and scale before plotting.

Lesson 12 Distances Across the Axes

Name _____ Show calculations, models, and units.

1. Plot (4, -4) and (4, -8). Find their distance.

2. Plot (-6, 4) and (-10, 4). Find their distance.

3. Plot (6, -4) and (6, -10). Find their distance.

4. Plot (-8, 6) and (3, 6). Find their distance.

5. Plot (3, -2) and (3, 2). Find their distance.

6. Plot (-3, 2) and (3, 2). Find their distance.

7. Plot (6, -5) and (6, 6). Find their distance. Explain why adding magnitudes works or does not work for these points.

8. Plot (-8, 5) and (2, 5). Find their distance. Explain why adding magnitudes works or does not work for these points.

9. Plot (2, -8) and (2, 5). Find their distance. Explain why adding magnitudes works or does not work for these points.

10. Plot (-3, 2) and (3, 2). Find their distance. Explain why adding magnitudes works or does not work for these points.

Name _____ Date _____

Rational Numbers and Coordinates

Unit 5 Test

Standards assessed 6.RP.A.3b, 6.RP.A.3c, 6.NS.C.5, 6.NS.C.6a, 6.NS.C.6c, 6.NS.C.7a, 6.NS.C.7b, 6.NS.C.7c, 6.NS.C.7d, 6.NS.C.6b, 6.NS.C.8

Questions 1–4 review Unit 4 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 5 points per question; 100 points total.

1. [Review] A cyclist travels 200 km in 5 hours at constant speed. Find the speed.

2. [Review] Pack A has 3 markers for $12; Pack B has 9 markers for $40.5. Find each unit price and the better buy.

3. [Review] Find 50% of 40.

4. [Review] Find 40% of 160.

5. [Current unit] A marker is 18 m above sea level. Write its signed elevation and explain what elevation 0 means.

6. [Current unit] Find the opposite of -7. Show both values on a number line.

7. [Current unit] Draw a horizontal or vertical number line. Plot and label -6, 0, and 6.

Name _____ Date _____

Rational Numbers and Coordinates

Unit 5 Test

Standards assessed 6.RP.A.3b, 6.RP.A.3c, 6.NS.C.5, 6.NS.C.6a, 6.NS.C.6c, 6.NS.C.7a, 6.NS.C.7b, 6.NS.C.7c, 6.NS.C.7d, 6.NS.C.6b, 6.NS.C.8

8. [Current unit] Draw a horizontal or vertical number line. Plot and label -1/2, 0, and 3/2.

9. [Current unit] Compare -1 ___ -1/2 using <, >, or =. Sketch a number line to justify.

10. [Current unit] Compare -2/5 ___ -5/3 using <, >, or =. Sketch a number line to justify.

11. [Current unit] Find |-4| and compare it with |2|.

12. [Current unit] Find |-21| and compare it with |3|.

13. [Current unit] Plot P(4, 5) on a coordinate plane and name its quadrant.

14. [Current unit] Plot (-3, 7), reflect it across both axes, and give the reflected coordinates.

Name _____ Date _____

Rational Numbers and Coordinates

Unit 5 Test

Standards assessed 6.RP.A.3b, 6.RP.A.3c, 6.NS.C.5, 6.NS.C.6a, 6.NS.C.6c, 6.NS.C.7a, 6.NS.C.7b, 6.NS.C.7c, 6.NS.C.7d, 6.NS.C.6b, 6.NS.C.8

15. [Current unit] Plot (3, -7) and (3, 7). Find their distance. Explain why adding magnitudes works or does not work for these points.

16. [Current unit] Plot (-6, 3) and (3, 3). Find their distance. Explain why adding magnitudes works or does not work for these points.

17. [Current unit] A marker is 16 m below sea level. Write its signed elevation and explain what elevation 0 means. Write the elevation of the point equally far on the opposite side of sea level.

18. [Current unit] Find the opposite of -7/5 and the opposite of that result. Locate all values on a number line.

19. [Current unit] Draw a horizontal or vertical number line. Plot and label -2/3, 0, and 4/3. Name the step size of your scale and explain the placement.

20. [Current unit] Draw a horizontal or vertical number line. Plot and label -2, 0, and 7/3. Name the step size of your scale and explain the placement.

Name _____ Date _____

Expressions and Equivalence

Lesson 1 Repeated Factors and Exponents

Standards 6.EE.A.1

Learning target I can write repeated multiplication using a whole-number exponent.

Learn and Discuss

The base is the repeated factor and the exponent tells how many copies to multiply. For a positive exponent, 4^3 = 4 × 4 × 4, not 4 × 3. Parentheses show when a whole product is the base.

Example 1 Write 2^4 as repeated multiplication and evaluate.
Solution 2 × 2 × 2 × 2 = 16. The exponent counts 4 factors of 2; multiply all factors.
Example 2 Write 7^4 as repeated multiplication and evaluate. Explain why it differs from 7 × 4.
Solution 7 × 7 × 7 × 7 = 2401; 7 × 4 = 28. The exponent counts 4 factors of 7; multiply all factors.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Repeated Factors and Exponents

Name _____ Show calculations, models, and units.

1. Write 3^4 as repeated multiplication and evaluate.

2. Write 4^4 as repeated multiplication and evaluate.

3. Write 2^3 as repeated multiplication and evaluate.

4. Write 6^3 as repeated multiplication and evaluate.

5. Write 2^4 as repeated multiplication and evaluate.

6. Write 5^4 as repeated multiplication and evaluate.

7. Write 7^2 as repeated multiplication and evaluate. Explain why it differs from 7 × 2.

8. Write 4^3 as repeated multiplication and evaluate. Explain why it differs from 4 × 3.

9. Write 6^2 as repeated multiplication and evaluate. Explain why it differs from 6 × 2.

10. Write 2^3 as repeated multiplication and evaluate. Explain why it differs from 2 × 3.

Name _____ Date _____

Expressions and Equivalence

Lesson 2 Powers and Their Values

Standards 6.EE.A.1

Learning target I can write repeated multiplication using a whole-number exponent.

Learn and Discuss

The base is the repeated factor and the exponent tells how many copies to multiply. For a positive exponent, 4^3 = 4 × 4 × 4, not 4 × 3. Parentheses show when a whole product is the base.

Example 1 Write 2^4 as repeated multiplication and evaluate.
Solution 2 × 2 × 2 × 2 = 16. The exponent counts 4 factors of 2; multiply all factors.
Example 2 Write 2^2 as repeated multiplication and evaluate. Explain why it differs from 2 × 2.
Solution 2 × 2 = 4; 2 × 2 = 4. The exponent counts 2 factors of 2; multiply all factors.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Powers and Their Values

Name _____ Show calculations, models, and units.

1. Write 2^2 as repeated multiplication and evaluate.

2. Write 3^3 as repeated multiplication and evaluate.

3. Write 4^3 as repeated multiplication and evaluate.

4. Write 8^2 as repeated multiplication and evaluate.

5. Write 7^3 as repeated multiplication and evaluate.

6. Write 4^2 as repeated multiplication and evaluate.

7. Write 6^4 as repeated multiplication and evaluate. Explain why it differs from 6 × 4.

8. Write 3^2 as repeated multiplication and evaluate. Explain why it differs from 3 × 2.

9. Write 3^4 as repeated multiplication and evaluate. Explain why it differs from 3 × 4.

10. Write 7^4 as repeated multiplication and evaluate. Explain why it differs from 7 × 4.

Name _____ Date _____

Expressions and Equivalence

Lesson 3 Order of Operations

Standards 6.EE.A.1, 6.EE.A.2c

Learning target I can evaluate expressions using the order of operations.

Learn and Discuss

Work inside parentheses, then evaluate exponents. Multiply and divide from left to right; then add and subtract from left to right. Multiplication does not automatically come before division.

Example 1 Evaluate 5 + 6 × 4. Show the intermediate steps.
Solution 29. Use parentheses and exponents first, then × and ÷ left to right, then + and -. Result: 29.
Example 2 Evaluate 6 ÷ 3 × 7 + 3^2. Show the intermediate steps.
Solution 23. Use parentheses and exponents first, then × and ÷ left to right, then + and -. Result: 23.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 3 Order of Operations

Name _____ Show calculations, models, and units.

1. Evaluate 7 + 6 × 3. Show the intermediate steps.

2. Evaluate 2 + 4 × 2. Show the intermediate steps.

3. Evaluate 5 + 7 × 4. Show the intermediate steps.

4. Evaluate (7 + 6) × 4^2. Show the intermediate steps.

5. Evaluate (2 + 2) × 3^2. Show the intermediate steps.

6. Evaluate (2 + 2) × 6^2. Show the intermediate steps.

7. Evaluate 16 ÷ 2 × 5 + 2^2. Show the intermediate steps.

8. Evaluate 21 ÷ 3 × 4 + 3^2. Show the intermediate steps.

9. Evaluate 8 ÷ 4 × 5 + 4^2. Show the intermediate steps.

10. Evaluate 6 ÷ 2 × 6 + 2^2. Show the intermediate steps.

Name _____ Date _____

Expressions and Equivalence

Lesson 4 Grouping and Left to Right Operations

Standards 6.EE.A.1, 6.EE.A.2c

Learning target I can evaluate expressions using the order of operations.

Learn and Discuss

Work inside parentheses, then evaluate exponents. Multiply and divide from left to right; then add and subtract from left to right. Multiplication does not automatically come before division.

Example 1 Evaluate 6 + 4 × 2. Show the intermediate steps.
Solution 14. Use parentheses and exponents first, then × and ÷ left to right, then + and -. Result: 14.
Example 2 Evaluate 18 ÷ 3 × 7 + 3^2. Show the intermediate steps.
Solution 51. Use parentheses and exponents first, then × and ÷ left to right, then + and -. Result: 51.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Grouping and Left to Right Operations

Name _____ Show calculations, models, and units.

1. Evaluate 2 + 3 × 3. Show the intermediate steps.

2. Evaluate 3 + 6 × 2. Show the intermediate steps.

3. Evaluate 4 + 6 × 2. Show the intermediate steps.

4. Evaluate (3 + 3) × 6^2. Show the intermediate steps.

5. Evaluate (2 + 4) × 4^2. Show the intermediate steps.

6. Evaluate (5 + 7) × 6^2. Show the intermediate steps.

7. Evaluate 18 ÷ 3 × 6 + 3^2. Show the intermediate steps.

8. Evaluate 25 ÷ 5 × 5 + 5^2. Show the intermediate steps.

9. Evaluate 16 ÷ 2 × 2 + 2^2. Show the intermediate steps.

10. Evaluate 35 ÷ 5 × 5 + 5^2. Show the intermediate steps.

Name _____ Date _____

Expressions and Equivalence

Quiz 1

Standards assessed 6.NS.C.6a, 6.EE.A.1, 6.EE.A.2c

Questions 1–1 review Unit 5 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Find the opposite of -2. Show both values on a number line.

2. [Current unit] Write 5^2 as repeated multiplication and evaluate.

3. [Current unit] Write 7^4 as repeated multiplication and evaluate.

4. [Current unit] Evaluate 12 ÷ 2 × 4 + 2^2. Show the intermediate steps.

5. [Current unit] Evaluate 14 ÷ 2 × 6 + 2^2. Show the intermediate steps.

Name _____ Date _____

Expressions and Equivalence

Lesson 5 Parts of an Expression

Standards 6.EE.A.2b

Learning target I can name terms, coefficients, factors, and grouped parts.

Learn and Discuss

Addition and subtraction separate terms. A coefficient multiplies a variable; a constant has no variable. A parenthesized sum can be one factor of a larger product, so describe both the inside and the whole expression.

Example 1 For 5x + 2y + 6, list terms, coefficients, and the constant.
Solution Terms 5x, 2y, 6; coefficients 5, 2; constant 6. Terms are separated by addition; coefficients multiply variables.
Example 2 In 6(x + 7), identify the outer operation, both factors, and the operation inside the grouped factor.
Solution Outer product; factors 6 and (x + 7); inner sum. The complete sum (x + 7) is one factor multiplied by 6.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 5 Parts of an Expression

Name _____ Show calculations, models, and units.

1. For 7x + 5y + 3, list terms, coefficients, and the constant.

2. For 4x + 4y + 6, list terms, coefficients, and the constant.

3. For (2x + 3) ÷ 2, name the outer operation, the dividend as a single entity, and the divisor. Identify the sum inside the parentheses.

4. For 3x + 4y + 3, list terms, coefficients, and the constant.

5. For (2x + 2) ÷ 5, name the outer operation, the dividend as a single entity, and the divisor. Identify the sum inside the parentheses.

6. For 2x + 6y + 4, list terms, coefficients, and the constant.

7. For (5x + 6) ÷ 5, name the outer operation, the dividend as a single entity, and the divisor. Identify the sum inside the parentheses.

8. In 5(x + 3), identify the outer operation, both factors, and the operation inside the grouped factor.

9. In 3(x + 5), identify the outer operation, both factors, and the operation inside the grouped factor.

10. In 7(x + 6), identify the outer operation, both factors, and the operation inside the grouped factor.

Name _____ Date _____

Expressions and Equivalence

Lesson 6 Words to Expressions

Standards 6.EE.A.2a, 6.EE.B.6

Learning target I can translate words and situations into expressions.

Learn and Discuss

Define the variable first. Use parentheses for a sum or difference that must stay together. Read subtraction carefully: five less than n means n - 5, while five minus n means 5 - n.

Example 1 Write an expression for 2 less than n.
Solution n - 2. Start with n, then subtract the named amount.
Example 2 A ticket costs $8. A group buys n tickets and pays a single $3 booking fee. Define n and write the total-cost expression. Evaluate it for n = 2.
Solution n = ticket count; 8n + 3; $19. Ticket cost is 8 × n; add the one-time fee 3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 6 Words to Expressions

Name _____ Show calculations, models, and units.

1. Write an expression for 2 less than n.

2. Write an expression for 6 less than n.

3. Write an expression for 5 less than n.

4. Write an expression for 3 times the sum of x and 2.

5. Write an expression for 3 times the sum of x and 6.

6. Write an expression for 3 times the sum of x and 3.

7. A ticket costs $2. A group buys n tickets and pays a single $7 booking fee. Define n and write the total-cost expression. Evaluate it for n = 3.

8. A ticket costs $7. A group buys n tickets and pays a single $5 booking fee. Define n and write the total-cost expression. Evaluate it for n = 2.

9. A ticket costs $6. A group buys n tickets and pays a single $3 booking fee. Define n and write the total-cost expression. Evaluate it for n = 4.

10. A ticket costs $3. A group buys n tickets and pays a single $4 booking fee. Define n and write the total-cost expression. Evaluate it for n = 4.

Name _____ Date _____

Expressions and Equivalence

Lesson 7 Expressions for Costs

Standards 6.EE.A.2a, 6.EE.B.6

Learning target I can translate words and situations into expressions.

Learn and Discuss

Define the variable first. Use parentheses for a sum or difference that must stay together. Read subtraction carefully: five less than n means n - 5, while five minus n means 5 - n.

Example 1 Write an expression for 8 less than n.
Solution n - 8. Start with n, then subtract the named amount.
Example 2 A ticket costs $7. A group buys n tickets and pays a single $6 booking fee. Define n and write the total-cost expression. Evaluate it for n = 3.
Solution n = ticket count; 7n + 6; $27. Ticket cost is 7 × n; add the one-time fee 6.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 7 Expressions for Costs

Name _____ Show calculations, models, and units.

1. Write an expression for 4 less than n.

2. Write an expression for 3 less than n.

3. Write an expression for 7 less than n.

4. Write an expression for 6 times the sum of x and 6.

5. Write an expression for 5 times the sum of x and 2.

6. Write an expression for 7 times the sum of x and 7.

7. A ticket costs $6. A group buys n tickets and pays a single $7 booking fee. Define n and write the total-cost expression. Evaluate it for n = 4.

8. A ticket costs $4. A group buys n tickets and pays a single $5 booking fee. Define n and write the total-cost expression. Evaluate it for n = 2.

9. A ticket costs $5. A group buys n tickets and pays a single $4 booking fee. Define n and write the total-cost expression. Evaluate it for n = 2.

10. A ticket costs $4. A group buys n tickets and pays a single $2 booking fee. Define n and write the total-cost expression. Evaluate it for n = 5.

Name _____ Date _____

Expressions and Equivalence

Lesson 8 Substitution and Evaluation

Standards 6.EE.A.2c

Learning target I can substitute values and evaluate expressions or formulas.

Learn and Discuss

Replace every variable with its assigned value, using parentheses. Apply the order of operations. In formulas, label the answer with the appropriate measurement units.

Example 1 Evaluate 5x + 2 for x = 5.
Solution 27. Substitute first: 5 × 5 + 2 = 27.
Example 2 A rectangle has length x + 2 and width 6. Use A = lw to write its area expression and find A when x = 2.
Solution A = 6(x + 2); 24 square units. Substitute x = 2: 6(2 + 2) = 24.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 8 Substitution and Evaluation

Name _____ Show calculations, models, and units.

1. Evaluate 7x + 6 for x = 2.

2. Evaluate 8x + 6 for x = 5.

3. Evaluate 2x + 6 for x = 4.

4. Evaluate x^2 + 2y for x = 4 and y = 4.

5. Evaluate x^2 + 8y for x = 5 and y = 4.

6. Evaluate x^2 + 7y for x = 5 and y = 3.

7. A rectangle has length x + 5 and width 6. Use A = lw to write its area expression and find A when x = 4.

8. A rectangle has length x + 6 and width 6. Use A = lw to write its area expression and find A when x = 3.

9. A rectangle has length x + 2 and width 3. Use A = lw to write its area expression and find A when x = 6.

10. A rectangle has length x + 4 and width 4. Use A = lw to write its area expression and find A when x = 3.

Name _____ Date _____

Expressions and Equivalence

Quiz 2

Standards assessed 6.NS.C.7c, 6.NS.C.7d, 6.EE.A.2b, 6.EE.A.2a, 6.EE.B.6, 6.EE.A.2c

Questions 1–1 review Unit 5 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Find |-15|. Explain the distance meaning.

2. [Current unit] For 5x + 2y + 2, list terms, coefficients, and the constant.

3. [Current unit] Write an expression for 5 times the sum of x and 5.

4. [Current unit] A ticket costs $4. A group buys n tickets and pays a single $3 booking fee. Define n and write the total-cost expression. Evaluate it for n = 6.

5. [Current unit] A rectangle has length x + 4 and width 4. Use A = lw to write its area expression and find A when x = 6.

Name _____ Date _____

Expressions and Equivalence

Lesson 9 Evaluating Formulas

Standards 6.EE.A.2c

Learning target I can substitute values and evaluate expressions or formulas.

Learn and Discuss

Replace every variable with its assigned value, using parentheses. Apply the order of operations. In formulas, label the answer with the appropriate measurement units.

Example 1 Evaluate 2x + 6 for x = 6.
Solution 18. Substitute first: 2 × 6 + 6 = 18.
Example 2 A rectangle has length x + 2 and width 2. Use A = lw to write its area expression and find A when x = 3.
Solution A = 2(x + 2); 10 square units. Substitute x = 3: 2(3 + 2) = 10.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 9 Evaluating Formulas

Name _____ Show calculations, models, and units.

1. Evaluate 2x + 2 for x = 6.

2. Evaluate 8x + 4 for x = 6.

3. Evaluate 4x + 6 for x = 2.

4. Evaluate x^2 + 8y for x = 5 and y = 5.

5. Evaluate x^2 + 5y for x = 5 and y = 6.

6. Evaluate x^2 + 8y for x = 3 and y = 3.

7. A rectangle has length x + 7 and width 6. Use A = lw to write its area expression and find A when x = 6.

8. A rectangle has length x + 5 and width 4. Use A = lw to write its area expression and find A when x = 4.

9. A rectangle has length x + 5 and width 5. Use A = lw to write its area expression and find A when x = 5.

10. A rectangle has length x + 4 and width 6. Use A = lw to write its area expression and find A when x = 6.

Name _____ Date _____

Expressions and Equivalence

Lesson 10 Distributing a Factor

Standards 6.EE.A.3

Learning target I can use distribution to generate an equivalent expression.

Learn and Discuss

Multiply the factor outside parentheses by every term inside. The two expressions have the same value for every allowed input. An area model can show how one rectangle splits into smaller rectangles.

Example 1 Expand 7(x + 4).
Solution 7x + 28. Multiply the outside factor by every inside term, including the constant.
Example 2 Expand 3(7x + 4). Verify your result at x = 2.
Solution 21x + 12; both give 54 at x = 2. Multiply the outside factor by every inside term, including the constant.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Distributing a Factor

Name _____ Show calculations, models, and units.

1. Expand 5(x + 2).

2. Expand 8(x + 2).

3. Expand 7(x + 2).

4. Expand 3(4x + 6).

5. Expand 7(4x + 3).

6. Expand 7(4x + 2).

7. Expand 3(7x + 4). Verify your result at x = 2.

8. Expand 5(2x + 5). Verify your result at x = 2.

9. Expand 8(5x + 6). Verify your result at x = 2.

10. Expand 8(6x + 3). Verify your result at x = 2.

Name _____ Date _____

Expressions and Equivalence

Lesson 11 Combining Like Terms

Standards 6.EE.A.3

Learning target I can combine terms with the same variable part.

Learn and Discuss

Terms with the same variable part count the same kind of object. Add their coefficients. Keep constants separate from variable terms and distribute before combining when parentheses are present.

Example 1 Simplify 7x + 6x. Explain which terms combine.
Solution 13x. Add coefficients of x terms; add only constants to constants. Distribute first if needed.
Example 2 Simplify 8(x + 3) + 2x. Explain which terms combine.
Solution 10x + 24. Add coefficients of x terms; add only constants to constants. Distribute first if needed.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 11 Combining Like Terms

Name _____ Show calculations, models, and units.

1. Simplify 5x + 4x. Explain which terms combine.

2. Simplify 6x + 2x. Explain which terms combine.

3. Simplify 3x + 4x. Explain which terms combine.

4. Simplify 3x + 6 + 2x + 3. Explain which terms combine.

5. Simplify 5x + 5 + 2x + 5. Explain which terms combine.

6. Simplify 4x + 2 + 3x + 4. Explain which terms combine.

7. Simplify 8(x + 3) + 5x. Explain which terms combine.

8. Simplify 5(x + 3) + 4x. Explain which terms combine.

9. Simplify 7(x + 3) + 4x. Explain which terms combine.

10. Simplify 4(x + 4) + 7x. Explain which terms combine.

Name _____ Date _____

Expressions and Equivalence

Lesson 12 Proving or Disproving Equivalence

Standards 6.EE.A.4

Learning target I can justify whether expressions are equivalent.

Learn and Discuss

Use operation properties to rewrite an expression. Matching values at one input do not prove equivalence for all inputs. A single counterexample is enough to show two expressions are not equivalent.

Example 1 Are 7(x + 3) and 7x + 21 equivalent for every x? Use a property or a counterexample.
Solution Yes; distribution gives 7x + 21. 7(x + 3) = 7x + 21. This matches.
Example 2 Are 2(x + 5) and 2x + 10 equivalent for every x? Use a property or a counterexample.
Solution Yes; distribution gives 2x + 10. 2(x + 5) = 2x + 10. This matches.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 12 Proving or Disproving Equivalence

Name _____ Show calculations, models, and units.

1. Are 8(x + 5) and 8x + 5 equivalent for every x? Use a property or a counterexample.

2. Are 4(x + 4) and 4x + 16 equivalent for every x? Use a property or a counterexample.

3. Are 8(x + 2) and 8x + 2 equivalent for every x? Use a property or a counterexample.

4. Are 5(x + 3) and 5x + 15 equivalent for every x? Use a property or a counterexample.

5. Are 7(x + 5) and 7x + 5 equivalent for every x? Use a property or a counterexample.

6. Are 7(x + 2) and 7x + 14 equivalent for every x? Use a property or a counterexample.

7. Are 4(x + 3) and 4x + 3 equivalent for every x? Use a property or a counterexample.

8. Are 6(x + 5) and 6x + 30 equivalent for every x? Use a property or a counterexample.

9. Are 5(x + 7) and 5x + 7 equivalent for every x? Use a property or a counterexample.

10. Are 2(x + 4) and 2x + 8 equivalent for every x? Use a property or a counterexample.

Name _____ Date _____

Expressions and Equivalence

Unit 6 Test

Standards assessed 6.NS.C.6c, 6.NS.C.7a, 6.NS.C.7b, 6.NS.C.6b, 6.NS.C.8, 6.EE.A.1, 6.EE.A.2c, 6.EE.A.2b, 6.EE.A.2a, 6.EE.B.6, 6.EE.A.3, 6.EE.A.4

Questions 1–4 review Unit 5 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 5 points per question; 100 points total.

1. [Review] Draw a horizontal or vertical number line. Plot and label -4, 0, and 3.

2. [Review] Compare -5 ___ -3 using <, >, or =. Sketch a number line to justify.

3. [Review] Plot P(-3, 2) on a coordinate plane and name its quadrant.

4. [Review] Plot (-7, 2) and (4, 2). Find their distance.

5. [Current unit] Write 4^4 as repeated multiplication and evaluate.

6. [Current unit] Write 3^2 as repeated multiplication and evaluate.

7. [Current unit] Evaluate 8 + 2 × 3. Show the intermediate steps.

Name _____ Date _____

Expressions and Equivalence

Unit 6 Test

Standards assessed 6.NS.C.6c, 6.NS.C.7a, 6.NS.C.7b, 6.NS.C.6b, 6.NS.C.8, 6.EE.A.1, 6.EE.A.2c, 6.EE.A.2b, 6.EE.A.2a, 6.EE.B.6, 6.EE.A.3, 6.EE.A.4

8. [Current unit] Evaluate (7 + 3) × 5^2. Show the intermediate steps.

9. [Current unit] For 2x + 2y + 3, list terms, coefficients, and the constant.

10. [Current unit] Write an expression for 5 times the sum of x and 6.

11. [Current unit] Write an expression for 2 times the sum of x and 4.

12. [Current unit] Evaluate x^2 + 6y for x = 6 and y = 4.

13. [Current unit] Evaluate x^2 + 6y for x = 2 and y = 6.

14. [Current unit] Expand 5(3x + 3). Verify your result at x = 2.

Name _____ Date _____

Expressions and Equivalence

Unit 6 Test

Standards assessed 6.NS.C.6c, 6.NS.C.7a, 6.NS.C.7b, 6.NS.C.6b, 6.NS.C.8, 6.EE.A.1, 6.EE.A.2c, 6.EE.A.2b, 6.EE.A.2a, 6.EE.B.6, 6.EE.A.3, 6.EE.A.4

15. [Current unit] Simplify 4(x + 4) + 6x. Explain which terms combine.

16. [Current unit] Are 3(x + 3) and 3x + 9 equivalent for every x? Use a property or a counterexample.

17. [Current unit] Write 5^3 as repeated multiplication and evaluate. Explain why it differs from 5 × 3.

18. [Current unit] Write 4^4 as repeated multiplication and evaluate. Explain why it differs from 4 × 4.

19. [Current unit] Evaluate 20 ÷ 4 × 6 + 4^2. Show the intermediate steps.

20. [Current unit] Evaluate 40 ÷ 5 × 7 + 5^2. Show the intermediate steps.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 1 Testing Equation Solutions

Standards 6.EE.B.5

Learning target I can test a proposed solution by substitution.

Learn and Discuss

Replace the variable with the proposed value, compute each side, and compare. A number is a solution only when it makes the original equation true.

Example 1 Does x = 3 solve 2x + 7 = 13? Show substitution.
Solution Yes; left side = 13. 2 × 3 + 7 = 13; compare with 13.
Example 2 Does x = 6 solve 6x + 4 = 40? Show substitution.
Solution Yes; left side = 40. 6 × 6 + 4 = 40; compare with 40.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Testing Equation Solutions

Name _____ Show calculations, models, and units.

1. Does x = 3 solve 3x + 4 = 10? Show substitution.

2. Does x = 4 solve 4x + 4 = 20? Show substitution.

3. Does x = 6 solve 3x + 6 = 21? Show substitution.

4. Does x = 6 solve 4x + 4 = 28? Show substitution.

5. Does x = 3 solve 2x + 7 = 11? Show substitution.

6. Does x = 4 solve 3x + 3 = 15? Show substitution.

7. Does x = 4 solve 4x + 7 = 19? Show substitution.

8. Does x = 3 solve 3x + 2 = 11? Show substitution.

9. Does x = 5 solve 3x + 2 = 14? Show substitution.

10. Does x = 5 solve 7x + 2 = 37? Show substitution.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 2 Solving Addition Equations

Standards 6.EE.B.7

Learning target I can solve x + p = q and check.

Learn and Discuss

Subtract p from both sides to preserve equality. Then substitute the answer into the original equation. The value of the left side must equal the right side.

Example 1 Solve x + 6 = 9. Check in the original equation.
Solution x = 3. Subtract 6 on both sides. Then x = 3; substitution gives 9 on each side.
Example 2 Solve x + 4 = 6. Check in the original equation.
Solution x = 2. Subtract 4 on both sides. Then x = 2; substitution gives 6 on each side.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Solving Addition Equations

Name _____ Show calculations, models, and units.

1. Solve x + 6 = 9. Check in the original equation.

2. Solve x + 4 = 9. Check in the original equation.

3. Solve x + 6 = 10. Check in the original equation.

4. Solve x + 8 = 21/2. Check in the original equation.

5. Solve x + 7 = 19/2. Check in the original equation.

6. Solve x + 5 = 15/2. Check in the original equation.

7. Solve x + 3/2 = 3. Check in the original equation.

8. Solve x + 1 = 5/2. Check in the original equation.

9. Solve x + 2 = 7/2. Check in the original equation.

10. Solve x + 2 = 4. Check in the original equation.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 3 Solving Subtraction Equations

Standards 6.EE.B.7

Learning target I can solve x - p = q and check.

Learn and Discuss

Add p to both sides to undo subtraction. Check by subtracting p from your answer. Values in this lesson are nonnegative rational numbers.

Example 1 Solve x - 3 = 3. Check in the original equation.
Solution x = 6. Add 3 on both sides. Then x = 6; substitution gives 3 on each side.
Example 2 Solve x - 1 = 1/2. Check in the original equation.
Solution x = 3/2. Add 1 on both sides. Then x = 3/2; substitution gives 1/2 on each side.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 3 Solving Subtraction Equations

Name _____ Show calculations, models, and units.

1. Solve x - 8 = 3/2. Check in the original equation.

2. Solve x - 8 = 1. Check in the original equation.

3. Solve x - 5 = 2. Check in the original equation.

4. Solve x - 7 = 3. Check in the original equation.

5. Solve x - 6 = 3. Check in the original equation.

6. Solve x - 5 = 5/2. Check in the original equation.

7. Solve x - 1 = 5/2. Check in the original equation.

8. Solve x - 4 = 1. Check in the original equation.

9. Solve x - 4 = 5/2. Check in the original equation.

10. Solve x - 3/2 = 0. Check in the original equation.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 4 Solving Multiplication Equations

Standards 6.EE.B.7

Learning target I can solve px = q using division.

Learn and Discuss

Divide both sides by the nonzero coefficient p. Keep the equation balanced. Check by multiplying the proposed solution by p.

Example 1 Solve 2 × x = 10. Check in the original equation.
Solution x = 5. Divide by 2 on both sides. Then x = 5; substitution gives 10 on each side.
Example 2 Solve 7/2 × x = 21/4. Check in the original equation.
Solution x = 3/2. Divide by 7/2 on both sides. Then x = 3/2; substitution gives 21/4 on each side.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Solving Multiplication Equations

Name _____ Show calculations, models, and units.

1. Solve 4 × x = 28. Check in the original equation.

2. Solve 6 × x = 24. Check in the original equation.

3. Solve 3 × x = 9. Check in the original equation.

4. Solve 4 × x = 12. Check in the original equation.

5. Solve 2 × x = 4. Check in the original equation.

6. Solve 6 × x = 15. Check in the original equation.

7. Solve 3/2 × x = 3/2. Check in the original equation.

8. Solve 3 × x = 3. Check in the original equation.

9. Solve 3/2 × x = 15/4. Check in the original equation.

10. Solve 1 × x = 2. Check in the original equation.

Name _____ Date _____

Equations Inequalities and Relationships

Quiz 1

Standards assessed 6.EE.A.1, 6.EE.B.5, 6.EE.B.7

Questions 1–1 review Unit 6 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Write 2^4 as repeated multiplication and evaluate.

2. [Current unit] Does x = 5 solve 5x + 4 = 29? Show substitution.

3. [Current unit] Solve x + 5 = 13/2. Check in the original equation.

4. [Current unit] Solve x - 2 = 1/2. Check in the original equation.

5. [Current unit] Solve 5/2 × x = 5. Check in the original equation.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 5 Solving Division Equations

Standards 6.EE.B.7

Learning target I can solve x/p = q using multiplication.

Learn and Discuss

Multiply both sides by the nonzero divisor p. Check by dividing the solution by p. Name the unknown quantity and attach its unit in a story problem.

Example 1 Solve x ÷ 4 = 7/4. Check in the original equation.
Solution x = 7. Multiply by 4 on both sides. Then x = 7; substitution gives 7/4 on each side.
Example 2 Solve x ÷ 7/2 = 5/7. Check in the original equation.
Solution x = 5/2. Multiply by 7/2 on both sides. Then x = 5/2; substitution gives 5/7 on each side.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 5 Solving Division Equations

Name _____ Show calculations, models, and units.

1. Solve x ÷ 8 = 7/8. Check in the original equation.

2. Solve x ÷ 5 = 6/5. Check in the original equation.

3. Solve x ÷ 7 = 6/7. Check in the original equation.

4. Solve x ÷ 8 = 5/16. Check in the original equation.

5. Solve x ÷ 6 = 1/3. Check in the original equation.

6. Solve x ÷ 3 = 5/6. Check in the original equation.

7. Solve x ÷ 2 = 5/4. Check in the original equation.

8. Solve x ÷ 1 = 3. Check in the original equation.

9. Solve x ÷ 7/2 = 6/7. Check in the original equation.

10. Solve x ÷ 7/2 = 4/7. Check in the original equation.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 6 One Step Equation Models

Standards 6.EE.B.6, 6.EE.B.7

Learning target I can model a situation with a one-step equation and solve it.

Learn and Discuss

Define the unknown quantity. Translate the relationship into an equation before calculating. Use the inverse operation and check whether the answer makes sense in the situation.

Example 1 A collection grows by 3 cards to 6 cards. Let x be the starting count. Write and solve an equation.
Solution x + 3 = 6; x = 3 cards. Subtract 3 from both sides; 3 + 3 = 6.
Example 2 5 identical lengths of rope total 35/2 m. Let x be the length of one piece. Write and solve an equation, then check.
Solution 5x = 35/2; x = 7/2 m. Divide the total by 5: 35/2 ÷ 5 = 7/2.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 6 One Step Equation Models

Name _____ Show calculations, models, and units.

1. A collection grows by 4 cards to 12 cards. Let x be the starting count. Write and solve an equation.

2. A collection grows by 8 cards to 56 cards. Let x be the starting count. Write and solve an equation.

3. A collection grows by 3 cards to 6 cards. Let x be the starting count. Write and solve an equation.

4. 7 identical lengths of rope total 28 m. Let x be the length of one piece. Write and solve an equation, then check.

5. 5 identical lengths of rope total 10 m. Let x be the length of one piece. Write and solve an equation, then check.

6. 6 identical lengths of rope total 24 m. Let x be the length of one piece. Write and solve an equation, then check.

7. 4 identical lengths of rope total 16 m. Let x be the length of one piece. Write and solve an equation, then check.

8. 2 identical lengths of rope total 6 m. Let x be the length of one piece. Write and solve an equation, then check.

9. 3 identical lengths of rope total 9/2 m. Let x be the length of one piece. Write and solve an equation, then check.

10. 5 identical lengths of rope total 20 m. Let x be the length of one piece. Write and solve an equation, then check.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 7 Writing and Graphing Inequalities

Standards 6.EE.B.8

Learning target I can write and graph a constraint using an inequality.

Learn and Discuss

Use > or < for a strict bound and ≥ or ≤ when the endpoint is included. Graph a strict bound with an open circle; use a closed circle for an included endpoint. Shade the direction of all solutions.

Example 1 Let x be any real number. Write and graph: x is less than 25. Label the endpoint and shade the solution ray.
Solution x < 25; open circle at 25, shade left. “less than” means <; exclude the endpoint.
Example 2 Let x be any real number. Write and graph: x is at least 8. Give one included value and explain whether the endpoint is included.
Solution x ≥ 8; closed circle at 8, shade right. “at least” means ≥; include the endpoint. Example solution: 9.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 7 Writing and Graphing Inequalities

Name _____ Show calculations, models, and units.

1. Let x be any real number. Write and graph: x is more than 16. Label the endpoint and shade the solution ray.

2. Let x be any real number. Write and graph: x is less than 12. Label the endpoint and shade the solution ray.

3. Let x be any real number. Write and graph: x is more than 12. Label the endpoint and shade the solution ray.

4. Let x be any real number. Write and graph: x is less than 24. Label the endpoint and shade the solution ray.

5. Let x be any real number. Write and graph: x is more than 15. Label the endpoint and shade the solution ray.

6. Let x be any real number. Write and graph: x is more than 10. Label the endpoint and shade the solution ray.

7. Let x be any real number. Write and graph: x is at least 49. Give one included value and explain whether the endpoint is included.

8. Let x be any real number. Write and graph: x is at least 20. Give one included value and explain whether the endpoint is included.

9. A museum group must have more than 8 participants. Let p be the participant count. Write an inequality and graph its real-number solution set. State which solutions make sense as participant counts.

10. A museum group must have at least 42 participants. Let p be the participant count. Write an inequality and graph its real-number solution set. State which solutions make sense as participant counts.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 8 Testing Inequality Solutions

Standards 6.EE.B.5, 6.EE.B.8

Learning target I can test values and explain the many solutions of an inequality.

Learn and Discuss

Substitute each value and decide whether the comparison is true. A continuous number-line ray represents infinitely many real-number solutions. A real situation may restrict useful solutions to whole numbers.

Example 1 Which values in {8, 9, 10} satisfy $x \le 9$? Test each by substitution.
Solution 8, 9. Values below 9 work; the endpoint works too.
Example 2 Which values in {10, 11, 12} satisfy $x \le 11$? Does the real-number inequality have only these solutions? Explain.
Solution 10, 11; no, infinitely many real values satisfy it. Values below 11 work; the endpoint works too.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 8 Testing Inequality Solutions

Name _____ Show calculations, models, and units.

1. Which values in {10, 11, 12} satisfy x < 11? Test each by substitution.

2. Which values in {5, 6, 7} satisfy x ≤ 6? Test each by substitution.

3. Which values in {8, 9, 10} satisfy x < 9? Test each by substitution.

4. Which values in {3, 4, 5} satisfy x ≤ 4? Test each by substitution.

5. Which values in {9, 10, 11} satisfy x < 10? Test each by substitution.

6. Which values in {14, 15, 16} satisfy x ≤ 15? Test each by substitution.

7. Which values in {7, 8, 9} satisfy x < 8? Does the real-number inequality have only these solutions? Explain.

8. Which values in {5, 6, 7} satisfy x ≤ 6? Does the real-number inequality have only these solutions? Explain.

9. Which values in {9, 10, 11} satisfy x < 10? Does the real-number inequality have only these solutions? Explain.

10. Which values in {14, 15, 16} satisfy x ≤ 15? Does the real-number inequality have only these solutions? Explain.

Name _____ Date _____

Equations Inequalities and Relationships

Quiz 2

Standards assessed 6.EE.A.2c, 6.EE.B.7, 6.EE.B.6, 6.EE.B.8, 6.EE.B.5

Questions 1–1 review Unit 6 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Evaluate $8x + 6$ for $x = 2$.

2. [Current unit] Solve $x \div 5 = 1/5$. Check in the original equation.

3. [Current unit] 6 identical lengths of rope total 42 m. Let x be the length of one piece. Write and solve an equation, then check.

4. [Current unit] Let x be any real number. Write and graph: x is at most 28. Give one included value and explain whether the endpoint is included.

5. [Current unit] Which values in {9, 10, 11} satisfy $x \leq 10$? Does the real-number inequality have only these solutions? Explain.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 9 Endpoints and Infinite Solutions

Standards 6.EE.B.8

Learning target I can write and graph a constraint using an inequality.

Learn and Discuss

Use > or < for a strict bound and ≥ or ≤ when the endpoint is included. Graph a strict bound with an open circle; use a closed circle for an included endpoint. Shade the direction of all solutions.

Example 1 Let x be any real number. Write and graph: x is more than 18. Label the endpoint and shade the solution ray.
Solution x > 18; open circle at 18, shade right. “more than” means >; exclude the endpoint.
Example 2 Let x be any real number. Write and graph: x is at least 10. Give one included value and explain whether the endpoint is included.
Solution x ≥ 10; closed circle at 10, shade right. “at least” means ≥; include the endpoint. Example solution: 11.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 9 Endpoints and Infinite Solutions

Name _____ Show calculations, models, and units.

1. Let x be any real number. Write and graph: x is more than 21. Label the endpoint and shade the solution ray.

2. Let x be any real number. Write and graph: x is at least 28. Label the endpoint and shade the solution ray.

3. Let x be any real number. Write and graph: x is at least 16. Label the endpoint and shade the solution ray.

4. Let x be any real number. Write and graph: x is less than 21. Label the endpoint and shade the solution ray.

5. Let x be any real number. Write and graph: x is less than 15. Label the endpoint and shade the solution ray.

6. Let x be any real number. Write and graph: x is at least 20. Label the endpoint and shade the solution ray.

7. Let x be any real number. Write and graph: x is at most 15. Give one included value and explain whether the endpoint is included.

8. Let x be any real number. Write and graph: x is at most 18. Give one included value and explain whether the endpoint is included.

9. A museum group must have more than 10 participants. Let p be the participant count. Write an inequality and graph its real-number solution set. State which solutions make sense as participant counts.

10. A museum group must have at least 20 participants. Let p be the participant count. Write an inequality and graph its real-number solution set. State which solutions make sense as participant counts.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 10 Dependent and Independent Variables

Standards 6.EE.C.9

Learning target I can identify quantities that change together and write a rule.

Learn and Discuss

The independent variable is the input you choose; the dependent variable changes with it. Define both and write the output in terms of the input. A table and graph must show the same rule and units.

Example 1 A shop charges $5 for each of n notebooks. Name the independent and dependent variables and write a cost rule.
Solution Independent n = notebooks; dependent C = cost; C = 5n. The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.
Example 2 A shop charges $3 for each of n notebooks plus a single $6 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?
Solution Independent n = notebooks; dependent C = cost; C = 3n + 6; C(0) = $6, the fee. The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Dependent and Independent Variables

Name _____ Show calculations, models, and units.

1. A shop charges $6 for each of n notebooks. Name the independent and dependent variables and write a cost rule.

2. A shop charges $2 for each of n notebooks. Name the independent and dependent variables and write a cost rule.

3. A shop charges $8 for each of n notebooks. Name the independent and dependent variables and write a cost rule.

4. A shop charges $4 for each of n notebooks plus a single $3 delivery fee. Name the independent and dependent variables and write a cost rule.

5. A shop charges $5 for each of n notebooks plus a single $3 delivery fee. Name the independent and dependent variables and write a cost rule.

6. A shop charges $3 for each of n notebooks plus a single $4 delivery fee. Name the independent and dependent variables and write a cost rule.

7. A shop charges $2 for each of n notebooks plus a single $5 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?

8. A shop charges $3 for each of n notebooks plus a single $5 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?

9. A shop charges $2 for each of n notebooks plus a single $2 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?

10. A shop charges $4 for each of n notebooks plus a single $5 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 11 Rules Tables and Graphs

Standards 6.EE.C.9

Learning target I can connect an equation, a table, and a graph.

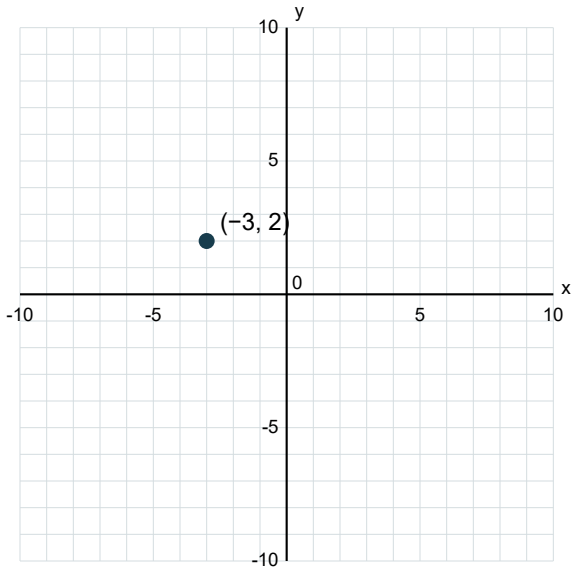
Learn and Discuss

Choose input values, substitute to find outputs, and write ordered pairs. Label horizontal input and vertical output axes. Plot each pair and interpret a point in the situation.

Example 1 For y = 8x, make a table for x = 0, 1, 2, 6. Plot the ordered pairs and label both axes.
Solution (0, 0); (1, 8); (2, 16); (6, 48). Substitute each input into y = 8x; x is horizontal and y vertical.
Example 2 For y = 6x + 7, make a table for x = 0, 1, 2, 6. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.
Solution (0, 7); (1, 13); (2, 19); (6, 43); y increases by 6. Substitute each input into y = 6x + 7; x is horizontal and y vertical.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.



Model a point (−3, 2) means move 3 left and 2 up from the origin. Label the axes and scale before plotting.

Lesson 11 Rules Tables and Graphs

Name _____ Show calculations, models, and units.

1. For y = 2x, make a table for x = 0, 1, 2, 6. Plot the ordered pairs and label both axes.

2. For y = 4x, make a table for x = 0, 1, 2, 3. Plot the ordered pairs and label both axes.

3. For y = 7x, make a table for x = 0, 1, 2, 4. Plot the ordered pairs and label both axes.

4. For y = 3x + 7, make a table for x = 0, 1, 2, 5. Plot the ordered pairs and label both axes.

5. For y = 7x + 3, make a table for x = 0, 1, 2, 4. Plot the ordered pairs and label both axes.

6. For y = 4x + 5, make a table for x = 0, 1, 2, 3. Plot the ordered pairs and label both axes.

7. For y = 7x + 6, make a table for x = 0, 1, 2, 3. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

8. For y = 6x + 5, make a table for x = 0, 1, 2, 4. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

9. For y = 5x + 3, make a table for x = 0, 1, 2, 2. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

10. For y = 5x + 6, make a table for x = 0, 1, 2, 4. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

Name _____ Date _____

Equations Inequalities and Relationships

Lesson 12 Interpreting Input Output Patterns

Standards 6.EE.C.9

Learning target I can connect an equation, a table, and a graph.

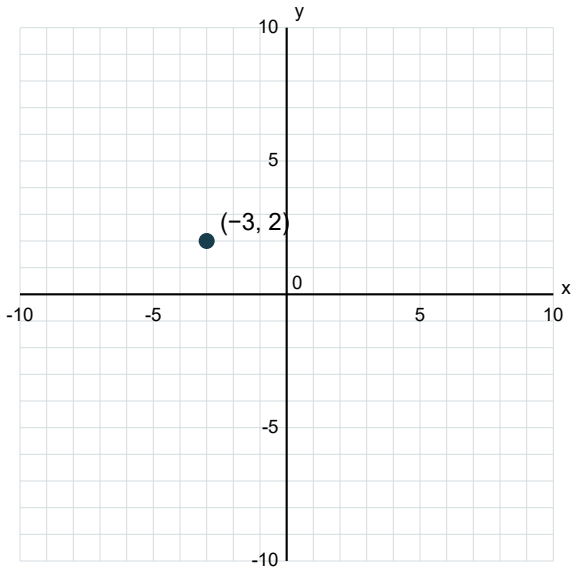
Learn and Discuss

Choose input values, substitute to find outputs, and write ordered pairs. Label horizontal input and vertical output axes. Plot each pair and interpret a point in the situation.

Example 1 For y = 7x, make a table for x = 0, 1, 2, 3. Plot the ordered pairs and label both axes.
Solution (0, 0); (1, 7); (2, 14); (3, 21). Substitute each input into y = 7x; x is horizontal and y vertical.
Example 2 For y = 6x + 3, make a table for x = 0, 1, 2, 6. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.
Solution (0, 3); (1, 9); (2, 15); (6, 39); y increases by 6. Substitute each input into y = 6x + 3; x is horizontal and y vertical.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.



Model a point (−3, 2) means move 3 left and 2 up from the origin. Label the axes and scale before plotting.

Lesson 12 Interpreting Input Output Patterns

Name _____ Show calculations, models, and units.

1. For y = 6x, make a table for x = 0, 1, 2, 4. Plot the ordered pairs and label both axes.

2. For y = 5x, make a table for x = 0, 1, 2, 6. Plot the ordered pairs and label both axes.

3. For y = 8x, make a table for x = 0, 1, 2, 5. Plot the ordered pairs and label both axes.

4. For y = 7x + 3, make a table for x = 0, 1, 2, 6. Plot the ordered pairs and label both axes.

5. For y = 5x + 5, make a table for x = 0, 1, 2, 4. Plot the ordered pairs and label both axes.

6. For y = 2x + 3, make a table for x = 0, 1, 2, 2. Plot the ordered pairs and label both axes.

7. For y = 8x + 3, make a table for x = 0, 1, 2, 4. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

8. For y = 8x + 6, make a table for x = 0, 1, 2, 6. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

9. For y = 4x + 6, make a table for x = 0, 1, 2, 4. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

10. For y = 6x + 2, make a table for x = 0, 1, 2, 6. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

Name _____ Date _____

Equations Inequalities and Relationships

Unit 7 Test

Standards assessed 6.EE.A.1, 6.EE.A.2c, 6.EE.A.2a, 6.EE.B.6, 6.EE.A.4, 6.EE.B.5, 6.EE.B.7, 6.EE.B.8, 6.EE.C.9

Questions 1–4 review Unit 6 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 5 points per question; 100 points total.

1. [Review] Evaluate $4 + 2 \times 6$. Show the intermediate steps.

2. [Review] Write an expression for 5 less than n.

3. [Review] Evaluate $7x + 4$ for $x = 6$.

4. [Review] Are $7(x + 7)$ and $7x + 49$ equivalent for every x? Use a property or a counterexample.

5. [Current unit] Does $x = 6$ solve $8x + 3 = 43$? Show substitution.

6. [Current unit] Solve $x + 4 = 7$. Check in the original equation.

7. [Current unit] Solve $x - 2 = 1$. Check in the original equation.

Name _____ Date _____

Equations Inequalities and Relationships

Unit 7 Test

Standards assessed 6.EE.A.1, 6.EE.A.2c, 6.EE.A.2a, 6.EE.B.6, 6.EE.A.4, 6.EE.B.5, 6.EE.B.7, 6.EE.B.8, 6.EE.C.9

8. [Current unit] Solve 2 × x = 5. Check in the original equation.

9. [Current unit] Solve x ÷ 5 = 3/5. Check in the original equation.

10. [Current unit] 7 identical lengths of rope total 42 m. Let x be the length of one piece. Write and solve an equation, then check.

11. [Current unit] Let x be any real number. Write and graph: x is less than 35. Label the endpoint and shade the solution ray.

12. [Current unit] Which values in {7, 8, 9} satisfy x ≤ 8? Test each by substitution.

13. [Current unit] Let x be any real number. Write and graph: x is less than 9. Label the endpoint and shade the solution ray.

14. [Current unit] A shop charges $3 for each of n notebooks plus a single $6 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?

Name _____ Date _____

Equations Inequalities and Relationships

Unit 7 Test

Standards assessed 6.EE.A.1, 6.EE.A.2c, 6.EE.A.2a, 6.EE.B.6, 6.EE.A.4, 6.EE.B.5, 6.EE.B.7, 6.EE.B.8, 6.EE.C.9

15. [Current unit] For y = 5x + 5, make a table for x = 0, 1, 2, 4. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

16. [Current unit] For y = 4x + 5, make a table for x = 0, 1, 2, 3. Plot the ordered pairs and label both axes. Explain what happens to y each time x increases by 1.

17. [Current unit] Does x = 4 solve 7x + 7 = 35? Show substitution.

18. [Current unit] Solve x + 3/2 = 5. Check in the original equation.

19. [Current unit] Solve x - 5/2 = 1/2. Check in the original equation.

20. [Current unit] Solve 1 × x = 7/2. Check in the original equation.

Name _____ Date _____

Area Volume and Surface Area

Lesson 1 Triangle Areas by Decomposition

Standards 6.G.A.1

Learning target I can find the area of any triangle using a perpendicular height.

Learn and Discuss

Two matching triangles form a parallelogram, so A = (base × perpendicular height)/2. A slanted side is not necessarily the height. Label area in square units.

Example 1 Sketch a triangle with base 4 cm and perpendicular height 4 cm. Find its area.
Solution 8 cm². A = bh/2 = 4 × 4 ÷ 2 = 8. Two such triangles make a parallelogram.
Example 2 Sketch a triangle with base 16 cm and perpendicular height 3 cm. Find its area. Explain why the slanted side is not needed.
Solution 24 cm². A = bh/2 = 16 × 3 ÷ 2 = 24. Two such triangles make a parallelogram.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Triangle Areas by Decomposition

Name _____ Show calculations, models, and units.

1. Sketch a triangle with base 6 cm and perpendicular height 2 cm. Find its area.

2. Sketch a triangle with base 12 cm and perpendicular height 6 cm. Find its area.

3. Sketch a triangle with base 10 cm and perpendicular height 3 cm. Find its area.

4. Sketch a triangle with base 4 cm and perpendicular height 5 cm. Find its area.

5. Sketch a triangle with base 4 cm and perpendicular height 2 cm. Find its area.

6. Sketch a triangle with base 14 cm and perpendicular height 6 cm. Find its area.

7. Sketch a triangle with base 6 cm and perpendicular height 3 cm. Find its area. Explain why the slanted side is not needed.

8. Sketch a triangle with base 4 cm and perpendicular height 2 cm. Find its area. Explain why the slanted side is not needed.

9. Sketch a triangle with base 12 cm and perpendicular height 2 cm. Find its area. Explain why the slanted side is not needed.

10. Sketch a triangle with base 12 cm and perpendicular height 3 cm. Find its area. Explain why the slanted side is not needed.

Name _____ Date _____

Area Volume and Surface Area

Lesson 2 Triangle Heights and Fractional Measures

Standards 6.G.A.1

Learning target I can find the area of any triangle using a perpendicular height.

Learn and Discuss

Two matching triangles form a parallelogram, so A = (base × perpendicular height)/2. A slanted side is not necessarily the height. Label area in square units.

Example 1 Sketch a triangle with base 12 cm and perpendicular height 3 cm. Find its area.
Solution 18 cm². A = bh/2 = 12 × 3 ÷ 2 = 18. Two such triangles make a parallelogram.
Example 2 Sketch a triangle with base 6 cm and perpendicular height 7/2 cm. Find its area. Explain why the slanted side is not needed.
Solution 21/2 cm². A = bh/2 = 6 × 7/2 ÷ 2 = 21/2. Two such triangles make a parallelogram.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Triangle Heights and Fractional Measures

Name _____ Show calculations, models, and units.

1. Sketch a triangle with base 4 cm and perpendicular height 7 cm. Find its area.

2. Sketch a triangle with base 4 cm and perpendicular height 3 cm. Find its area.

3. Sketch a triangle with base 16 cm and perpendicular height 7 cm. Find its area.

4. Sketch a triangle with base 4 cm and perpendicular height 6 cm. Find its area.

5. Sketch a triangle with base 10 cm and perpendicular height 7 cm. Find its area.

6. Sketch a triangle with base 4 cm and perpendicular height 4 cm. Find its area.

7. Sketch a triangle with base 8 cm and perpendicular height 2 cm. Find its area. Explain why the slanted side is not needed.

8. Sketch a triangle with base 14 cm and perpendicular height 5/2 cm. Find its area. Explain why the slanted side is not needed.

9. Sketch a triangle with base 10 cm and perpendicular height 2 cm. Find its area. Explain why the slanted side is not needed.

10. Sketch a triangle with base 8 cm and perpendicular height 1 cm. Find its area. Explain why the slanted side is not needed.

Name _____ Date _____

Area Volume and Surface Area

Lesson 3 Parallelograms and Trapezoids

Standards 6.G.A.1

Learning target I can find parallelogram and trapezoid areas by rearranging shapes.

Learn and Discuss

Cut and move a corner of a parallelogram to make a rectangle: A = bh. Two matching trapezoids form a parallelogram, giving A = (b1 + b2)h/2. Heights must be perpendicular.

Example 1 A parallelogram has base 7 m and perpendicular height 6 m. Sketch how it can be rearranged into a rectangle and find its area.
Solution 42 m². Cut and shift a corner; A = bh = 7 × 6 = 42.
Example 2 A trapezoid has parallel bases 14 m and 20 m and perpendicular height 6 m. Sketch it and find its area.
Solution 102 m². A = (14 + 20) × 6 ÷ 2 = 102.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 3 Parallelograms and Trapezoids

Name _____ Show calculations, models, and units.

1. A parallelogram has base 3 m and perpendicular height 4 m. Sketch how it can be rearranged into a rectangle and find its area.

2. A parallelogram has base 7 m and perpendicular height 5 m. Sketch how it can be rearranged into a rectangle and find its area.

3. A parallelogram has base 2 m and perpendicular height 4 m. Sketch how it can be rearranged into a rectangle and find its area.

4. A trapezoid has parallel bases 10 m and 22 m and perpendicular height 3 m. Sketch it and find its area.

5. A trapezoid has parallel bases 10 m and 20 m and perpendicular height 7 m. Sketch it and find its area.

6. A trapezoid has parallel bases 6 m and 18 m and perpendicular height 3 m. Sketch it and find its area.

7. A trapezoid has parallel bases 12 m and 22 m and perpendicular height 5 m. Sketch it and find its area.

8. A trapezoid has parallel bases 4 m and 10 m and perpendicular height 5 m. Sketch it and find its area.

9. A trapezoid has parallel bases 16 m and 28 m and perpendicular height 6 m. Sketch it and find its area.

10. A trapezoid has parallel bases 12 m and 24 m and perpendicular height 4 m. Sketch it and find its area.

Name _____ Date _____

Area Volume and Surface Area

Lesson 4 Composite Polygon Areas

Standards 6.G.A.1

Learning target I can decompose a polygon into familiar shapes to find area.

Learn and Discuss

Sketch the figure and label every given length. Split the region into nonoverlapping rectangles and triangles, or subtract a cutout from a larger rectangle. Add only the areas that belong to the figure.

Example 1 An L-shaped garden is a 7 m by 8 m rectangle with an 3 m by 4 m corner rectangle removed. Sketch and find the garden area.
Solution 44 m². Outer area 56 minus cutout 12 = 44.
Example 2 A 8 m by 4 m rectangle has a right-triangle corner removed with perpendicular legs 2 m and 2 m. Sketch the remaining polygon and find its area.
Solution 30 m². Whole rectangle 32; remove triangle 2; difference 30.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Composite Polygon Areas

Name _____ Show calculations, models, and units.

1. An L-shaped garden is a 14 m by 9 m rectangle with an 8 m by 3 m corner rectangle removed. Sketch and find the garden area.

2. An L-shaped garden is a 8 m by 10 m rectangle with an 4 m by 6 m corner rectangle removed. Sketch and find the garden area.

3. An L-shaped garden is a 13 m by 8 m rectangle with an 7 m by 2 m corner rectangle removed. Sketch and find the garden area.

4. An L-shaped garden is a 13 m by 10 m rectangle with an 7 m by 4 m corner rectangle removed. Sketch and find the garden area.

5. An L-shaped garden is a 5 m by 4 m rectangle with an 3 m by 2 m corner rectangle removed. Sketch and find the garden area.

6. An L-shaped garden is a 7 m by 11 m rectangle with an 3 m by 7 m corner rectangle removed. Sketch and find the garden area.

7. A 4 m by 6 m rectangle has a right-triangle corner removed with perpendicular legs 2 m and 4 m. Sketch the remaining polygon and find its area.

8. A 13 m by 9 m rectangle has a right-triangle corner removed with perpendicular legs 6 m and 3 m. Sketch the remaining polygon and find its area.

9. A 13 m by 8 m rectangle has a right-triangle corner removed with perpendicular legs 6 m and 2 m. Sketch the remaining polygon and find its area.

10. A 6 m by 8 m rectangle has a right-triangle corner removed with perpendicular legs 2 m and 6 m. Sketch the remaining polygon and find its area.

Name _____ Date _____

Area Volume and Surface Area

Quiz 1

Standards assessed 6.EE.B.7, 6.G.A.1

Questions 1–1 review Unit 7 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Solve x + 5 = 9. Check in the original equation.

2. [Current unit] Sketch a triangle with base 16 cm and perpendicular height 4 cm. Find its area.

3. [Current unit] Sketch a triangle with base 16 cm and perpendicular height 2 cm. Find its area.

4. [Current unit] A trapezoid has parallel bases 6 m and 12 m and perpendicular height 7 m. Sketch it and find its area.

5. [Current unit] A 6 m by 5 m rectangle has a right-triangle corner removed with perpendicular legs 2 m and 3 m. Sketch the remaining polygon and find its area.

Name _____ Date _____

Area Volume and Surface Area

Lesson 5 Polygons on the Coordinate Plane

Standards 6.G.A.3, 6.G.A.1

Learning target I can draw polygons from coordinates and use side lengths to find area.

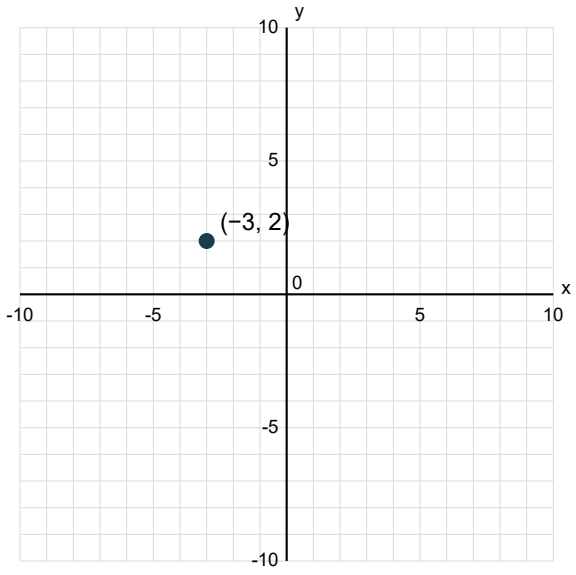
Learn and Discuss

Plot vertices in order and connect them, including the last to the first. Equal x-values make a vertical side; equal y-values make a horizontal side. Count or subtract coordinates to get the side lengths.

Example 1 Plot and connect (0,0), (8,0), (8,10), (0,10). Find the side lengths and area.
Solution Sides 8 and 10; area 80 square units. Horizontal length 8 - (0) = 8; vertical length 10 - (0) = 10; area = 8 × 10.
Example 2 Plot and connect (-5,-4), (4,-4), (4,4), (-5,4). Find the side lengths and area. Find the perimeter too.
Solution Sides 9 and 8; area 72 square units; perimeter 34 units. Horizontal length 4 - (-5) = 9; vertical length 4 - (-4) = 8; area = 9 × 8.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.



Model a point (−3, 2) means move 3 left and 2 up from the origin. Label the axes and scale before plotting.

Lesson 5 Polygons on the Coordinate Plane

Name _____ Show calculations, models, and units.

1. Plot and connect (0,0), (10,0), (10,12), (0,12). Find the side lengths and area.

2. Plot and connect (0,0), (11,0), (11,8), (0,8). Find the side lengths and area.

3. Plot and connect (0,0), (6,0), (6,10), (0,10). Find the side lengths and area.

4. Plot and connect (-2,-4), (2,-4), (2,2), (-2,2). Find the side lengths and area.

5. Plot and connect (-3,-7), (2,-7), (2,2), (-3,2). Find the side lengths and area.

6. Plot and connect (-8,-2), (3,-2), (3,3), (-8,3). Find the side lengths and area.

7. Plot and connect (-5,-7), (5,-7), (5,5), (-5,5). Find the side lengths and area. Find the perimeter too.

8. Plot and connect (-5,-4), (6,-4), (6,6), (-5,6). Find the side lengths and area. Find the perimeter too.

9. Plot and connect (-8,-5), (2,-5), (2,2), (-8,2). Find the side lengths and area. Find the perimeter too.

10. Plot and connect (-3,-2), (2,-2), (2,2), (-3,2). Find the side lengths and area. Find the perimeter too.

Name _____ Date _____

Area Volume and Surface Area

Lesson 6 Volume with Fractional Edges

Standards 6.G.A.2

Learning target I can calculate prism volume with fractional edge lengths.

Learn and Discuss

A rectangular prism has volume V = lwh = Bh, where B is base area. Fractional edge lengths still multiply. Use cubic units; surface area and volume measure different attributes.

Example 1 A rectangular prism has edges 2, 3, and 5 cm. Sketch it and find its volume.
Solution 30 cm³. B = 2 × 3 = 6 cm²; V = B × 5 = 30 cm³.
Example 2 A rectangular prism has edges 4, 1, and 1 1/2 cm. Sketch it and find its volume. Show both lwh and Bh.
Solution 6 cm³. B = 4 × 1 = 4 cm²; V = B × 3/2 = 6 cm³.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 6 Volume with Fractional Edges

Name _____ Show calculations, models, and units.

1. A rectangular prism has edges 7, 1 1/2, and 5 cm. Sketch it and find its volume.

2. A rectangular prism has edges 2, 2 1/2, and 5 cm. Sketch it and find its volume.

3. A rectangular prism has edges 3, 1, and 5 cm. Sketch it and find its volume.

4. A rectangular prism has edges 1 1/2, 2 1/2, and 5 cm. Sketch it and find its volume.

5. A rectangular prism has edges 2, 2, and 2 cm. Sketch it and find its volume.

6. A rectangular prism has edges 3, 1, and 6 cm. Sketch it and find its volume.

7. A rectangular prism has edges 1 1/2, 2 1/2, and 1 cm. Sketch it and find its volume. Show both lwh and Bh.

8. A rectangular prism has edges 1, 3, and 1 cm. Sketch it and find its volume. Show both lwh and Bh.

9. A rectangular prism has edges 3 1/2, 2, and 1 1/2 cm. Sketch it and find its volume. Show both lwh and Bh.

10. A rectangular prism has edges 3 1/2, 3, and 2 1/2 cm. Sketch it and find its volume. Show both lwh and Bh.

Name _____ Date _____

Area Volume and Surface Area

Lesson 7 Base Area and Prism Volume

Standards 6.G.A.2

Learning target I can calculate prism volume with fractional edge lengths.

Learn and Discuss

A rectangular prism has volume V = lwh = Bh, where B is base area. Fractional edge lengths still multiply. Use cubic units; surface area and volume measure different attributes.

Example 1 A rectangular prism has edges 7, 3, and 2 cm. Sketch it and find its volume.
Solution 42 cm³. B = 7 × 3 = 21 cm²; V = B × 2 = 42 cm³.
Example 2 A rectangular prism has edges 2, 2, and 3 cm. Sketch it and find its volume. Show both lwh and Bh.
Solution 12 cm³. B = 2 × 2 = 4 cm²; V = B × 3 = 12 cm³.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 7 Base Area and Prism Volume

Name _____ Show calculations, models, and units.

1. A rectangular prism has edges 3, 2, and 6 cm. Sketch it and find its volume.

2. A rectangular prism has edges 4, 3 1/2, and 2 cm. Sketch it and find its volume.

3. A rectangular prism has edges 8, 3, and 5 cm. Sketch it and find its volume.

4. A rectangular prism has edges 2 1/2, 3, and 5 cm. Sketch it and find its volume.

5. A rectangular prism has edges 1, 3, and 6 cm. Sketch it and find its volume.

6. A rectangular prism has edges 3, 1 1/2, and 6 cm. Sketch it and find its volume.

7. A rectangular prism has edges 2, 2, and 2 cm. Sketch it and find its volume. Show both lwh and Bh.

8. A rectangular prism has edges 2, 1, and 3 cm. Sketch it and find its volume. Show both lwh and Bh.

9. A rectangular prism has edges 2, 3, and 1 cm. Sketch it and find its volume. Show both lwh and Bh.

10. A rectangular prism has edges 3, 2, and 2 cm. Sketch it and find its volume. Show both lwh and Bh.

Name _____ Date _____

Area Volume and Surface Area

Lesson 8 Packing Fractional Unit Cubes

Standards 6.G.A.2

Learning target I can connect fractional unit cubes with a prism volume formula.

Learn and Discuss

For cubes with edge 1/n, each cube has volume 1/n^3 cubic unit. Divide each prism edge by 1/n to count cubes along it. Multiply the counts, then multiply by the volume of one small cube.

Example 1 Fill a prism 5/2 × 2 × 1 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.
Solution 40 cubes; each 1/8 cubic unit; prism 5 cubic units. Counts along edges: 5, 4, 2. Product 40; 40 × 1/8 = 5, also lwh.
Example 2 Fill a prism 5/3 × 7/3 × 5/3 units with cubes of edge 1/3 unit. How many cubes fit? Use their volumes to verify lwh.
Solution 175 cubes; each 1/27 cubic unit; prism 175/27 cubic units. Counts along edges: 5, 7, 5. Product 175; 175 × 1/27 = 175/27, also lwh.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 8 Packing Fractional Unit Cubes

Name _____ Show calculations, models, and units.

1. Fill a prism 3 × 7/2 × 3/2 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.

2. Fill a prism 4 × 1 × 5/2 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.

3. Fill a prism 4 × 3/2 × 3/2 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.

4. Fill a prism 4 × 7/2 × 1 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.

5. Fill a prism 5/2 × 5/2 × 3/2 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.

6. Fill a prism 1 × 3 × 5/2 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.

7. Fill a prism 2/3 × 2/3 × 2 units with cubes of edge 1/3 unit. How many cubes fit? Use their volumes to verify lwh.

8. Fill a prism 7/3 × 1 × 5/3 units with cubes of edge 1/3 unit. How many cubes fit? Use their volumes to verify lwh.

9. Fill a prism 4/3 × 2/3 × 2/3 units with cubes of edge 1/3 unit. How many cubes fit? Use their volumes to verify lwh.

10. Fill a prism 2/3 × 2 × 4/3 units with cubes of edge 1/3 unit. How many cubes fit? Use their volumes to verify lwh.

Name _____ Date _____

Area Volume and Surface Area

Quiz 2

Standards assessed 6.EE.B.5, 6.EE.B.8, 6.G.A.3, 6.G.A.1, 6.G.A.2

Questions 1–1 review Unit 7 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Which values in {8, 9, 10} satisfy x ≤ 9? Test each by substitution.

2. [Current unit] Plot and connect (-2,-2), (4,-2), (4,4), (-2,4). Find the side lengths and area.

3. [Current unit] A rectangular prism has edges 1 1/2, 1 1/2, and 3 cm. Sketch it and find its volume.

4. [Current unit] A rectangular prism has edges 3, 3, and 1 1/2 cm. Sketch it and find its volume. Show both lwh and Bh.

5. [Current unit] Fill a prism 4/3 × 2 × 2 units with cubes of edge 1/3 unit. How many cubes fit? Use their volumes to verify lwh.

Name _____ Date _____

Area Volume and Surface Area

Lesson 9 Drawing and Labeling Nets

Standards 6.G.A.4

Learning target I can draw a net and account for every face of a solid.

Learn and Discuss

A net unfolds all faces into a plane without overlap. Rectangular prisms have three matching pairs of rectangles. Pyramids have a polygonal base and triangular sides. Add face areas, not edge lengths.

Example 1 Draw a net for a closed 3 × 4 × 5 cm rectangular prism. Label the six faces and calculate total area.
Solution 2 faces each of 3×4, 3×5, 4×5; 94 cm². Add 2(12) + 2(15) + 2(20) = 94.
Example 2 Draw a net for a triangular prism. Its two congruent right-triangle bases have legs 3 cm and 4 cm and hypotenuse 5 cm; prism length is 5 cm. Label all faces and find surface area.
Solution 2 triangles (area 6 each), rectangles 3×5, 4×5, 5×5; SA 72 cm². Triangle pair: 12 cm²; rectangles: (3+4+5) × 5 = 60; total 72.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 9 Drawing and Labeling Nets

Name _____ Show calculations, models, and units.

1. Draw a net for a closed 5 × 5 × 4 cm rectangular prism. Label the six faces and calculate total area.

2. Draw a net for a closed 3 × 3 × 2 cm rectangular prism. Label the six faces and calculate total area.

3. Draw a net for a closed 7 × 3 × 3 cm rectangular prism. Label the six faces and calculate total area.

4. Draw a net for a closed 2 × 4 × 3 cm rectangular prism. Label the six faces and calculate total area.

5. Draw a net for a closed 2 × 2 × 4 cm rectangular prism. Label the six faces and calculate total area.

6. Draw a net for a closed 6 × 7 × 2 cm rectangular prism. Label the six faces and calculate total area.

7. Draw a net for a triangular prism. Its two congruent right-triangle bases have legs 3 cm and 4 cm and hypotenuse 5 cm; prism length is 5 cm. Label all faces and find surface area.

8. Draw a net for a triangular prism. Its two congruent right-triangle bases have legs 3 cm and 4 cm and hypotenuse 5 cm; prism length is 4 cm. Label all faces and find surface area.

9. Draw a net for a triangular prism. Its two congruent right-triangle bases have legs 3 cm and 4 cm and hypotenuse 5 cm; prism length is 8 cm. Label all faces and find surface area.

10. Draw a net for a triangular prism. Its two congruent right-triangle bases have legs 3 cm and 4 cm and hypotenuse 5 cm; prism length is 3 cm. Label all faces and find surface area.

Name _____ Date _____

Area Volume and Surface Area

Lesson 10 Prism Surface Area

Standards 6.G.A.4

Learning target I can use a rectangular-prism net to find surface area.

Learn and Discuss

A closed rectangular prism has two faces of area lw, two of lh, and two of wh. Add the six face areas: SA = 2lw + 2lh + 2wh. If a face is missing, do not include it.

Example 1 A 6 cm by 2 cm base and 2 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.
Solution 56 cm². Closed surface area = 2(12+12+4) = 56.
Example 2 A 7 cm by 5 cm base and 4 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.
Solution 131 cm². Closed surface area = 2(35+28+20) = 166. Remove the top area 35: 131.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Prism Surface Area

Name _____ Show calculations, models, and units.

1. A 8 cm by 4 cm base and 5 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

2. A 7 cm by 5 cm base and 6 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

3. A 2 cm by 5 cm base and 6 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

4. A 4 cm by 7 cm base and 4 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

5. A 8 cm by 4 cm base and 4 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

6. A 2 cm by 2 cm base and 2 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

7. A 4 cm by 6 cm base and 4 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.

8. A 6 cm by 6 cm base and 2 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.

9. A 7 cm by 7 cm base and 4 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.

10. A 8 cm by 5 cm base and 5 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.

Name _____ Date _____

Area Volume and Surface Area

Lesson 11 Pyramid Nets and Surface Area

Standards 6.G.A.4

Learning target I can find pyramid surface area from its triangular faces and base.

Learn and Discuss

For a square pyramid, draw one square and four triangles. Each triangle has area base edge × face height / 2. The face height is measured on the triangular face, not vertically inside the solid.

Example 1 A square pyramid has base edge 16 cm. Each triangular face has perpendicular face height 10 cm. Draw a net and calculate total surface area.
Solution 576 cm². Base = 256; each triangle = 16 × 10 ÷ 2 = 80; add four triangles to get 576.
Example 2 A square pyramid has base edge 6 cm. Each triangular face has perpendicular face height 9 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.
Solution 144 cm². Base = 36; each triangle = 6 × 9 ÷ 2 = 27; add four triangles to get 144.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 11 Pyramid Nets and Surface Area

Name _____ Show calculations, models, and units.

1. A square pyramid has base edge 6 cm. Each triangular face has perpendicular face height 5 cm. Draw a net and calculate total surface area.

2. A square pyramid has base edge 4 cm. Each triangular face has perpendicular face height 8 cm. Draw a net and calculate total surface area.

3. A square pyramid has base edge 4 cm. Each triangular face has perpendicular face height 6 cm. Draw a net and calculate total surface area.

4. A square pyramid has base edge 10 cm. Each triangular face has perpendicular face height 9 cm. Draw a net and calculate total surface area.

5. A square pyramid has base edge 14 cm. Each triangular face has perpendicular face height 13 cm. Draw a net and calculate total surface area.

6. A square pyramid has base edge 6 cm. Each triangular face has perpendicular face height 8 cm. Draw a net and calculate total surface area.

7. A square pyramid has base edge 12 cm. Each triangular face has perpendicular face height 8 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

8. A square pyramid has base edge 12 cm. Each triangular face has perpendicular face height 9 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

9. A square pyramid has base edge 10 cm. Each triangular face has perpendicular face height 10 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

10. A square pyramid has base edge 14 cm. Each triangular face has perpendicular face height 13 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

Name _____ Date _____

Area Volume and Surface Area

Lesson 12 Choosing Area Volume or Surface Area

Standards 6.G.A.1, 6.G.A.2, 6.G.A.4

Learning target I can choose the correct geometric measure and justify the units.

Learn and Discuss

Read the requested quantity first and identify the relevant model. Two matching triangles form a parallelogram, so A = (base × perpendicular height)/2. A slanted side is not necessarily the height. Label area in square units. Explain why the units and the final value fit the situation.

Example 1 A rectangular prism has edges 3, 1 1/2, and 6 cm. Sketch it and find its volume.
Solution 27 cm³. B = 3 × 3/2 = 9/2 cm²; V = B × 6 = 27 cm³.
Example 2 A 3 cm by 5 cm base and 4 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.
Solution 79 cm². Closed surface area = 2(15+12+20) = 94. Remove the top area 15: 79.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 12 Choosing Area Volume or Surface Area

Name _____ Show calculations, models, and units.

1. Sketch a triangle with base 16 cm and perpendicular height 3 cm. Find its area.

2. A rectangular prism has edges 6, 1, and 5 cm. Sketch it and find its volume.

3. A 6 cm by 2 cm base and 2 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

4. An L-shaped garden is a 11 m by 11 m rectangle with an 7 m by 7 m corner rectangle removed. Sketch and find the garden area.

5. A square pyramid has base edge 8 cm. Each triangular face has perpendicular face height 7 cm. Draw a net and calculate total surface area.

6. Sketch a triangle with base 8 cm and perpendicular height 2 cm. Find its area.

7. A rectangular prism has edges 2 1/2, 2 1/2, and 3 cm. Sketch it and find its volume. Show both lwh and Bh.

8. A 4 cm by 7 cm base and 3 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.

9. A 11 m by 7 m rectangle has a right-triangle corner removed with perpendicular legs 3 m and 4 m. Sketch the remaining polygon and find its area.

10. A square pyramid has base edge 14 cm. Each triangular face has perpendicular face height 10 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

Name _____ Date _____

Area Volume and Surface Area

Unit 8 Test

Standards assessed 6.EE.B.7, 6.EE.B.6, 6.EE.B.8, 6.EE.C.9, 6.G.A.1, 6.G.A.3, 6.G.A.2, 6.G.A.4

Questions 1–4 review Unit 7 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 5 points per question; 100 points total.

1. [Review] Solve x - 7 = 5/2. Check in the original equation.

2. [Review] A collection grows by 8 cards to 32 cards. Let x be the starting count. Write and solve an equation.

3. [Review] Let x be any real number. Write and graph: x is less than 16. Label the endpoint and shade the solution ray.

4. [Review] For y = 6x + 4, make a table for x = 0, 1, 2, 6. Plot the ordered pairs and label both axes.

5. [Current unit] Sketch a triangle with base 10 cm and perpendicular height 6 cm. Find its area.

6. [Current unit] Sketch a triangle with base 10 cm and perpendicular height 2 cm. Find its area.

7. [Current unit] A parallelogram has base 3 m and perpendicular height 3 m. Sketch how it can be rearranged into a rectangle and find its area.

Name _____ Date _____

Area Volume and Surface Area

Unit 8 Test

Standards assessed 6.EE.B.7, 6.EE.B.6, 6.EE.B.8, 6.EE.C.9, 6.G.A.1, 6.G.A.3, 6.G.A.2, 6.G.A.4

8. [Current unit] An L-shaped garden is a 9 m by 8 m rectangle with an 7 m by 6 m corner rectangle removed. Sketch and find the garden area.

9. [Current unit] Plot and connect (-8,-6), (2,-6), (2,2), (-8,2). Find the side lengths and area.

10. [Current unit] A rectangular prism has edges 4, 2, and 5 cm. Sketch it and find its volume.

11. [Current unit] A rectangular prism has edges 4, 2 1/2, and 2 cm. Sketch it and find its volume.

12. [Current unit] Fill a prism 2 × 2 × 3/2 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.

13. [Current unit] Draw a net for a closed 2 × 3 × 4 cm rectangular prism. Label the six faces and calculate total area.

14. [Current unit] A 5 cm by 2 cm base and 5 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.

Name _____ Date _____

Area Volume and Surface Area

Unit 8 Test

Standards assessed 6.EE.B.7, 6.EE.B.6, 6.EE.B.8, 6.EE.C.9, 6.G.A.1, 6.G.A.3, 6.G.A.2, 6.G.A.4

15. [Current unit] A square pyramid has base edge 12 cm. Each triangular face has perpendicular face height 12 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

16. [Current unit] A 4 cm by 7 cm base and 4 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.

17. [Current unit] Sketch a triangle with base 14 cm and perpendicular height 2 cm. Find its area. Explain why the slanted side is not needed.

18. [Current unit] Sketch a triangle with base 6 cm and perpendicular height 7/2 cm. Find its area. Explain why the slanted side is not needed.

19. [Current unit] A trapezoid has parallel bases 8 m and 20 m and perpendicular height 4 m. Sketch it and find its area.

20. [Current unit] A 9 m by 10 m rectangle has a right-triangle corner removed with perpendicular legs 5 m and 5 m. Sketch the remaining polygon and find its area.

Name _____ Date _____

Statistics and Data Displays

Lesson 1 Questions That Anticipate Variability

Standards 6.SP.A.1

Learning target I can recognize a statistical question and the expected variability.

Learn and Discuss

A statistical question anticipates different answers in a collection of data. Name the group, the measured attribute, and the expected variation. A question about one fixed fact is not statistical.

Example 1 Is “How many centimeters are in one meter?” statistical? Explain.
Solution No; one fixed conversion, 100 cm.. Look for a collection of data and anticipated variation; identify the population and variable.
Example 2 A survey asks “Is our school nice?” Improve it to collect numerical data with expected variation.
Solution Example: On a 1 to 5 scale, how do students in our class rate the school library? Ratings vary among students; the numerical scale must be defined.. Look for a collection of data and anticipated variation; identify the population and variable.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Questions That Anticipate Variability

Name _____ Show calculations, models, and units.

1. Is “How many pages did each student read last night?” statistical? Explain.

2. Is “How many centimeters are in one meter?” statistical? Explain.

3. Is “What are the heights of the plants in our garden?” statistical? Explain.

4. Identify the group, attribute, and units in: How many minutes do students in our class sleep each night?

5. Rewrite “How long is my pencil?” as a statistical question.

6. A student asks only one person’s age once. Explain why “How old is this person today?” is not statistical.

7. Write a statistical question about travel to school. Name the group, attribute, units, and why answers may vary.

8. A survey asks “Is our school nice?” Improve it to collect numerical data with expected variation.

9. Plan a class investigation of daily water use. Write a statistical question, identify a unit, and describe how to collect comparable data.

10. Critique: “A question is statistical whenever it contains numbers.” Give a counterexample and a corrected rule.

Name _____ Date _____

Statistics and Data Displays

Lesson 2 Center Spread and Shape

Standards 6.SP.A.2, 6.SP.A.3

Learning target I can describe a distribution by center, spread, and shape.

Learn and Discuss

A distribution shows which values occur and how often. Describe a typical value, how spread out the values are, and whether the shape is roughly symmetric, skewed, clustered, or has unusual values.

Example 1 Reading times in minutes are 7, 8, 8, 9, 9, 10. Describe a typical value, range, shape, and any striking value.
Solution Center near 17/2 min; range 3 min; roughly symmetric; no isolated extreme. The values balance around the middle. Range = 10 - 7.
Example 2 Reading times in minutes are 2, 3, 3, 4, 5, 14. Describe a typical value, range, shape, and any striking value.
Solution Center near 7/2 min; range 12 min; right-skewed with high value 14 min. The values cluster low with a long high tail. Range = 14 - 2.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Center Spread and Shape

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 5, 6, 6, 7, 7, 8. Describe a typical value, range, shape, and any striking value.

2. Reading times in minutes are 4, 5, 5, 6, 6, 7. Describe a typical value, range, shape, and any striking value.

3. Reading times in minutes are 8, 9, 9, 10, 10, 11. Describe a typical value, range, shape, and any striking value.

4. Reading times in minutes are 4, 9, 9, 14, 14, 19. Describe a typical value, range, shape, and any striking value.

5. Reading times in minutes are 2, 6, 6, 10, 10, 14. Describe a typical value, range, shape, and any striking value.

6. Reading times in minutes are 4, 6, 6, 8, 8, 10. Describe a typical value, range, shape, and any striking value.

7. Reading times in minutes are 7, 8, 8, 9, 10, 19. Describe a typical value, range, shape, and any striking value.

8. Reading times in minutes are 8, 9, 9, 10, 11, 20. Describe a typical value, range, shape, and any striking value.

9. Reading times in minutes are 4, 5, 5, 6, 7, 16. Describe a typical value, range, shape, and any striking value.

10. Reading times in minutes are 2, 3, 3, 4, 5, 14. Describe a typical value, range, shape, and any striking value.

Name _____ Date _____

Statistics and Data Displays

Lesson 3 Mean and Observation Counts

Standards 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5c

Learning target I can calculate and interpret the mean of numerical data.

Learn and Discuss

The mean is a fair share: add all values and divide by the number of observations. Report the count and measurement units. A large unusual value can pull the mean toward it.

Example 1 Reading times in minutes are 5, 6, 6, 7, 7, 8. Report n, units, and mean.
Solution n = 6; minutes; mean 13/2 min. Sum = 39; mean = 39 ÷ 6 = 13/2.
Example 2 Reading times in minutes are 5, 6, 6, 7, 8, 17. Report n, units, and mean. If one more student reads 9 minutes, find the new mean.
Solution n = 6; minutes; mean 49/6 min; new mean 58/7 min. Sum = 49; mean = 49 ÷ 6 = 49/6. New sum = 58; divide by 7.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 3 Mean and Observation Counts

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 3, 4, 4, 5, 5, 6. Report n, units, and mean.

2. Reading times in minutes are 2, 3, 3, 4, 4, 5. Report n, units, and mean.

3. Reading times in minutes are 7, 8, 8, 9, 9, 10. Report n, units, and mean.

4. Reading times in minutes are 3, 9, 9, 15, 15, 21. Report n, units, and mean.

5. Reading times in minutes are 8, 14, 14, 20, 20, 26. Report n, units, and mean.

6. Reading times in minutes are 4, 9, 9, 14, 14, 19. Report n, units, and mean.

7. Reading times in minutes are 3, 4, 4, 5, 6, 15. Report n, units, and mean. If one more student reads 7 minutes, find the new mean.

8. Reading times in minutes are 8, 9, 9, 10, 11, 20. Report n, units, and mean. If one more student reads 12 minutes, find the new mean.

9. Reading times in minutes are 4, 5, 5, 6, 7, 16. Report n, units, and mean. If one more student reads 8 minutes, find the new mean.

10. Reading times in minutes are 6, 7, 7, 8, 9, 18. Report n, units, and mean. If one more student reads 10 minutes, find the new mean.

Name _____ Date _____

Statistics and Data Displays

Lesson 4 Medians and Unusual Values

Standards 6.SP.B.5c

Learning target I can find a median and compare it with the mean.

Learn and Discuss

Order the data first. For an odd count, choose the middle value. For an even count, average the two middle values. The median often resists an unusually high or low value better than the mean.

Example 1 Reading times in minutes are 4, 5, 5, 6, 6, 7. Find the median. Show the middle positions.
Solution Median 11/2 min. 6 ordered values: average positions 3 and 4: (5 + 6) ÷ 2 = 11/2.
Example 2 Reading times in minutes are 8, 9, 9, 10, 11, 20. Find the median and mean. Explain the difference in this set.
Solution Median 19/2 min; mean 67/6 min; the high value pulls the mean upward. 6 ordered values: average positions 3 and 4: (9 + 10) ÷ 2 = 19/2.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Medians and Unusual Values

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 4, 5, 5, 6, 6, 7. Find the median. Show the middle positions.

2. Reading times in minutes are 3, 4, 4, 5, 5, 6. Find the median. Show the middle positions.

3. Reading times in minutes are 2, 3, 3, 4, 4, 5. Find the median. Show the middle positions.

4. Reading times in minutes are 8, 10, 10, 12, 12, 14. Find the median. Show the middle positions.

5. Reading times in minutes are 4, 8, 8, 12, 12, 16. Find the median. Show the middle positions.

6. Reading times in minutes are 2, 7, 7, 12, 12, 17. Find the median. Show the middle positions.

7. Reading times in minutes are 6, 7, 7, 8, 9, 18. Find the median and mean. Explain the difference in this set.

8. Reading times in minutes are 4, 5, 5, 6, 7, 16. Find the median and mean. Explain the difference in this set.

9. Reading times in minutes are 3, 4, 4, 5, 6, 15. Find the median and mean. Explain the difference in this set.

10. Reading times in minutes are 8, 9, 9, 10, 11, 20. Find the median and mean. Explain the difference in this set.

Name _____ Date _____

Statistics and Data Displays

Quiz 1

Standards assessed 6.G.A.1, 6.SP.A.1, 6.SP.A.2, 6.SP.A.3, 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5c

Questions 1–1 review Unit 8 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Sketch a triangle with base 14 cm and perpendicular height 5 cm. Find its area.

2. [Current unit] Identify the group, attribute, and units in: How many minutes do students in our class sleep each night?

3. [Current unit] Reading times in minutes are 4, 7, 7, 10, 10, 13. Describe a typical value, range, shape, and any striking value.

4. [Current unit] Reading times in minutes are 7, 8, 8, 9, 10, 19. Report n, units, and mean. If one more student reads 11 minutes, find the new mean.

5. [Current unit] Reading times in minutes are 7, 8, 8, 9, 10, 19. Find the median and mean. Explain the difference in this set.

Name _____ Date _____

Statistics and Data Displays

Lesson 5 Quartiles and Interquartile Range

Standards 6.SP.A.3, 6.SP.B.5c

Learning target I can calculate quartiles and interquartile range.

Learn and Discuss

Sort the data. Find the median, then the median of each half for Q1 and Q3. For an odd count, exclude the overall median from both halves in this course. IQR = Q3 - Q1; range = maximum - minimum.

Example 1 Reading times in minutes are 7, 8, 8, 9, 9, 10. Find Q1, Q3, IQR, and range.
Solution Q1 8, Q3 9; IQR 1 min; range 3 min. Lower half [7, 8, 8] has median 8; upper half [9, 9, 10] has median 9. Subtract Q1 from Q3.
Example 2 Reading times in minutes are 3, 4, 4, 5, 6, 15. Find Q1, Q3, IQR, and range. Explain what IQR describes.
Solution Q1 4, Q3 6; IQR 2 min; range 12 min; IQR is the span of the middle half. Lower half [3, 4, 4] has median 4; upper half [5, 6, 15] has median 6. Subtract Q1 from Q3.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 5 Quartiles and Interquartile Range

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 2, 3, 3, 4, 4, 5. Find Q1, Q3, IQR, and range.

2. Reading times in minutes are 6, 7, 7, 8, 8, 9. Find Q1, Q3, IQR, and range.

3. Reading times in minutes are 8, 9, 9, 10, 10, 11. Find Q1, Q3, IQR, and range.

4. Reading times in minutes are 3, 8, 8, 13, 13, 18. Find Q1, Q3, IQR, and range.

5. Reading times in minutes are 5, 8, 8, 11, 11, 14. Find Q1, Q3, IQR, and range.

6. Reading times in minutes are 5, 7, 7, 9, 9, 11. Find Q1, Q3, IQR, and range.

7. Reading times in minutes are 2, 3, 3, 4, 5, 14. Find Q1, Q3, IQR, and range. Explain what IQR describes.

8. Reading times in minutes are 5, 6, 6, 7, 8, 17. Find Q1, Q3, IQR, and range. Explain what IQR describes.

9. Reading times in minutes are 7, 8, 8, 9, 10, 19. Find Q1, Q3, IQR, and range. Explain what IQR describes.

10. Reading times in minutes are 8, 9, 9, 10, 11, 20. Find Q1, Q3, IQR, and range. Explain what IQR describes.

Name _____ Date _____

Statistics and Data Displays

Lesson 6 Mean Absolute Deviation

Standards 6.SP.B.5c

Learning target I can calculate and interpret mean absolute deviation.

Learn and Discuss

Find the mean. Calculate each value's distance from the mean, add those distances, then divide by the number of observations. MAD describes a typical distance from the mean in the original units.

Example 1 Reading times in minutes are 5, 6, 6, 7, 7, 8. Calculate the mean and MAD. Show all absolute deviations.
Solution Mean 13/2 min; MAD 5/6 min. Distances: 3/2, 1/2, 1/2, 1/2, 1/2, 3/2; sum 5; divide by 6 = 5/6.
Example 2 Reading times in minutes are 5, 6, 6, 7, 8, 17. Calculate the mean and MAD. Show all absolute deviations. Interpret MAD in a sentence.
Solution Mean 49/6 min; MAD 53/18 min; a typical distance from the mean is 53/18 min. Distances: 19/6, 13/6, 13/6, 7/6, 1/6, 53/6; sum 53/3; divide by 6 = 53/18.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 6 Mean Absolute Deviation

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 8, 9, 9, 10, 10, 11. Calculate the mean and MAD. Show all absolute deviations.

2. Reading times in minutes are 7, 8, 8, 9, 9, 10. Calculate the mean and MAD. Show all absolute deviations.

3. Reading times in minutes are 2, 3, 3, 4, 4, 5. Calculate the mean and MAD. Show all absolute deviations.

4. Reading times in minutes are 8, 10, 10, 12, 12, 14. Calculate the mean and MAD. Show all absolute deviations.

5. Reading times in minutes are 8, 12, 12, 16, 16, 20. Calculate the mean and MAD. Show all absolute deviations.

6. Reading times in minutes are 4, 6, 6, 8, 8, 10. Calculate the mean and MAD. Show all absolute deviations.

7. Reading times in minutes are 4, 5, 5, 6, 7, 16. Calculate the mean and MAD. Show all absolute deviations. Interpret MAD in a sentence.

8. Reading times in minutes are 3, 4, 4, 5, 6, 15. Calculate the mean and MAD. Show all absolute deviations. Interpret MAD in a sentence.

9. Reading times in minutes are 2, 3, 3, 4, 5, 14. Calculate the mean and MAD. Show all absolute deviations. Interpret MAD in a sentence.

10. Reading times in minutes are 7, 8, 8, 9, 10, 19. Calculate the mean and MAD. Show all absolute deviations. Interpret MAD in a sentence.

Name _____ Date _____

Statistics and Data Displays

Lesson 7 Choosing Measures of Center

Standards 6.SP.B.5d

Learning target I can choose a measure of center and explain why.

Learn and Discuss

Use the shape and context. Mean with mean absolute deviation can describe fairly symmetric data. Median with interquartile range often describes skewed data or data with an unusual value more fairly.

Example 1 Reading times in minutes are 2, 3, 3, 4, 4, 5. Choose a center and matching variability measure. Calculate both and justify your choice.
Solution Mean 7/2 min and MAD 5/6 min; roughly symmetric data. Mean = 7/2, median = 7/2, IQR = 4 - 3 = 1, MAD = 5/6. Accept another justified choice tied to shape and purpose.
Example 2 Reading times in minutes are 7, 8, 8, 9, 10, 19. Choose a center and matching variability measure. Calculate both and justify your choice.
Solution Median 17/2 min and IQR 2 min; high value makes these resistant measures useful. Mean = 61/6, median = 17/2, IQR = 10 - 8 = 2, MAD = 53/18. Accept another justified choice tied to shape and purpose.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 7 Choosing Measures of Center

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 4, 5, 5, 6, 6, 7. Choose a center and matching variability measure. Calculate both and justify your choice.

2. Reading times in minutes are 3, 4, 4, 5, 5, 6. Choose a center and matching variability measure. Calculate both and justify your choice.

3. Reading times in minutes are 8, 9, 9, 10, 10, 11. Choose a center and matching variability measure. Calculate both and justify your choice.

4. Reading times in minutes are 5, 9, 9, 13, 13, 17. Choose a center and matching variability measure. Calculate both and justify your choice.

5. Reading times in minutes are 4, 9, 9, 14, 14, 19. Choose a center and matching variability measure. Calculate both and justify your choice.

6. Reading times in minutes are 8, 10, 10, 12, 12, 14. Choose a center and matching variability measure. Calculate both and justify your choice.

7. Reading times in minutes are 5, 6, 6, 7, 8, 17. Choose a center and matching variability measure. Calculate both and justify your choice.

8. Reading times in minutes are 6, 7, 7, 8, 9, 18. Choose a center and matching variability measure. Calculate both and justify your choice.

9. Reading times in minutes are 3, 4, 4, 5, 6, 15. Choose a center and matching variability measure. Calculate both and justify your choice.

10. Reading times in minutes are 4, 5, 5, 6, 7, 16. Choose a center and matching variability measure. Calculate both and justify your choice.

Name _____ Date _____

Statistics and Data Displays

Lesson 8 Dot Plots on a Number Line

Standards 6.SP.B.4

Learning target I can construct and interpret a dot plot on a number line.

Learn and Discuss

Draw an equally spaced number line and stack one dot per observation above its value. Repeated values stack vertically. Add an axis label with units and check that the dot count equals the data count.

Example 1 Reading times in minutes are 5, 6, 6, 7, 7, 8. Draw a labeled dot plot. Check the number of dots.
Solution 5: 1 dot; 6: 2 dots; 7: 2 dots; 8: 1 dot; n = 6. Each observation contributes one dot; stack repeated values at their number-line position.
Example 2 Reading times in minutes are 2, 3, 3, 4, 5, 14. Draw a labeled dot plot. Describe a cluster or gap and report the count.
Solution 2: 1 dot; 3: 2 dots; 4: 1 dot; 5: 1 dot; 14: 1 dot; n = 6; low cluster and high isolated value. Each observation contributes one dot; stack repeated values at their number-line position.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 8 Dot Plots on a Number Line

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 8, 9, 9, 10, 10, 11. Draw a labeled dot plot. Check the number of dots.

2. Reading times in minutes are 3, 4, 4, 5, 5, 6. Draw a labeled dot plot. Check the number of dots.

3. Reading times in minutes are 6, 7, 7, 8, 8, 9. Draw a labeled dot plot. Check the number of dots.

4. Reading times in minutes are 2, 6, 6, 10, 10, 14. Draw a labeled dot plot. Check the number of dots.

5. Reading times in minutes are 8, 11, 11, 14, 14, 17. Draw a labeled dot plot. Check the number of dots.

6. Reading times in minutes are 3, 6, 6, 9, 9, 12. Draw a labeled dot plot. Check the number of dots.

7. Reading times in minutes are 6, 7, 7, 8, 9, 18. Draw a labeled dot plot. Describe a cluster or gap and report the count.

8. Reading times in minutes are 3, 4, 4, 5, 6, 15. Draw a labeled dot plot. Describe a cluster or gap and report the count.

9. Reading times in minutes are 2, 3, 3, 4, 5, 14. Draw a labeled dot plot. Describe a cluster or gap and report the count.

10. Reading times in minutes are 4, 5, 5, 6, 7, 16. Draw a labeled dot plot. Describe a cluster or gap and report the count.

Name _____ Date _____

Statistics and Data Displays

Quiz 2

Standards assessed 6.G.A.2, 6.SP.A.3, 6.SP.B.5c, 6.SP.B.5d, 6.SP.B.4

Questions 1–1 review Unit 8 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Fill a prism 5/2 × 3/2 × 3/2 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.

2. [Current unit] Reading times in minutes are 6, 9, 9, 12, 12, 15. Find Q1, Q3, IQR, and range.

3. [Current unit] Reading times in minutes are 5, 7, 7, 9, 9, 11. Calculate the mean and MAD. Show all absolute deviations.

4. [Current unit] Reading times in minutes are 7, 8, 8, 9, 10, 19. Choose a center and matching variability measure. Calculate both and justify your choice.

5. [Current unit] Reading times in minutes are 5, 6, 6, 7, 8, 17. Draw a labeled dot plot. Describe a cluster or gap and report the count.

Name _____ Date _____

Statistics and Data Displays

Lesson 9 Histograms and Intervals

Standards 6.SP.B.4

Learning target I can construct and interpret a histogram with equal-width bins.

Learn and Discuss

Group numerical values into adjacent, nonoverlapping intervals. Count each observation in exactly one interval, draw touching bars, and label the numerical axis and the frequency axis.

Example 1 Daily reading times in minutes: 3, 16, 11, 3, 1, 19. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes.
Solution Frequencies 3, 0, 1, 2. Count every value once. Bars touch and have equal width; horizontal axis is minutes, vertical axis is frequency.
Example 2 Daily reading times in minutes: 2, 5, 6, 19, 18, 14, 17, 3, 3, 14. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes. Which interval has the greatest frequency? Include ties.
Solution Frequencies 3, 2, 2, 3; greatest: 0–4, 15–19. Count every value once. Bars touch and have equal width; horizontal axis is minutes, vertical axis is frequency.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 9 Histograms and Intervals

Name _____ Show calculations, models, and units.

1. Daily reading times in minutes: 11, 7, 14, 11, 7, 8. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes.

2. Daily reading times in minutes: 14, 13, 7, 11, 9, 3. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes.

3. Daily reading times in minutes: 10, 9, 2, 15, 15, 6. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes.

4. Daily reading times in minutes: 13, 4, 3, 10, 1, 15, 15, 16, 18, 5. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes.

5. Daily reading times in minutes: 10, 10, 10, 0, 4, 19, 0, 0, 4, 17. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes.

6. Daily reading times in minutes: 3, 6, 7, 3, 18, 2, 2, 13, 12, 3. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes.

7. Daily reading times in minutes: 16, 12, 7, 19, 5, 14, 2, 18, 11, 16. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes. Which interval has the greatest frequency? Include ties.

8. Daily reading times in minutes: 8, 7, 8, 17, 7, 6, 17, 8, 7, 2. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes. Which interval has the greatest frequency? Include ties.

9. Daily reading times in minutes: 10, 11, 12, 4, 5, 14, 12, 16, 0, 14. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes. Which interval has the greatest frequency? Include ties.

10. Daily reading times in minutes: 17, 15, 18, 8, 8, 9, 14, 1, 4, 11. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes. Which interval has the greatest frequency? Include ties.

Name _____ Date _____

Statistics and Data Displays

Lesson 10 Box Plots and Five Number Summaries

Standards 6.SP.B.4, 6.SP.B.5c

Learning target I can create a box plot from a five-number summary.

Learn and Discuss

Find minimum, Q1, median, Q3, and maximum. Draw a box from Q1 to Q3 with a median line and whiskers to the endpoints. Use an equally spaced number line with units.

Example 1 Reading times in minutes are 4, 5, 5, 6, 6, 7. Find the five-number summary and draw a labeled box plot.
Solution (4, 5, 11/2, 6, 7). Box runs from 5 to 6, median line at 11/2, whiskers to 4 and 7.
Example 2 Reading times in minutes are 7, 8, 8, 9, 10, 19. Find the five-number summary and draw a labeled box plot. State the IQR.
Solution (7, 8, 17/2, 10, 19); IQR 2 min. Box runs from 8 to 10, median line at 17/2, whiskers to 7 and 19.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Box Plots and Five Number Summaries

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 8, 9, 9, 10, 10, 11. Find the five-number summary and draw a labeled box plot.

2. Reading times in minutes are 4, 5, 5, 6, 6, 7. Find the five-number summary and draw a labeled box plot.

3. Reading times in minutes are 6, 7, 7, 8, 8, 9. Find the five-number summary and draw a labeled box plot.

4. Reading times in minutes are 2, 5, 5, 8, 8, 11. Find the five-number summary and draw a labeled box plot.

5. Reading times in minutes are 2, 6, 6, 10, 10, 14. Find the five-number summary and draw a labeled box plot.

6. Reading times in minutes are 8, 11, 11, 14, 14, 17. Find the five-number summary and draw a labeled box plot.

7. Reading times in minutes are 7, 8, 8, 9, 10, 19. Find the five-number summary and draw a labeled box plot. State the IQR.

8. Reading times in minutes are 5, 6, 6, 7, 8, 17. Find the five-number summary and draw a labeled box plot. State the IQR.

9. Reading times in minutes are 8, 9, 9, 10, 11, 20. Find the five-number summary and draw a labeled box plot. State the IQR.

10. Reading times in minutes are 3, 4, 4, 5, 6, 15. Find the five-number summary and draw a labeled box plot. State the IQR.

Name _____ Date _____

Statistics and Data Displays

Lesson 11 Comparing Data Sets

Standards 6.SP.A.2, 6.SP.B.5d

Learning target I can compare centers and variability in two data sets.

Learn and Discuss

Compute comparable measures for both groups. Compare typical values and consistency using the same units. State what the data support without claiming that every member of one group exceeds every member of the other.

Example 1 Reading times (min): Group A [2, 3, 3, 4, 4, 5], Group B [4, 5, 5, 6, 6, 7]. Compare median and IQR. Which group reads longer typically? Which is more consistent?
Solution A median 7/2, B median 11/2 min; both IQR 1 min. B is typically 2 min higher; equal middle-half variability.. Adding 2 shifts all values and the median by 2, but does not change Q3 - Q1.
Example 2 Reading times (min): Group A [6, 7, 7, 8, 9, 18], Group B [8, 9, 9, 10, 11, 20]. Compare median and IQR. Which group reads longer typically? Which is more consistent?
Solution A median 15/2, B median 19/2 min; both IQR 2 min. B is typically 2 min higher; equal middle-half variability.. Adding 2 shifts all values and the median by 2, but does not change Q3 - Q1.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 11 Comparing Data Sets

Name _____ Show calculations, models, and units.

1. Reading times (min): Group A [2, 3, 3, 4, 4, 5], Group B [4, 5, 5, 6, 6, 7]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

2. Reading times (min): Group A [8, 9, 9, 10, 10, 11], Group B [10, 11, 11, 12, 12, 13]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

3. Reading times (min): Group A [4, 5, 5, 6, 6, 7], Group B [6, 7, 7, 8, 8, 9]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

4. Reading times (min): Group A [6, 8, 8, 10, 10, 12], Group B [8, 10, 10, 12, 12, 14]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

5. Reading times (min): Group A [2, 6, 6, 10, 10, 14], Group B [4, 8, 8, 12, 12, 16]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

6. Reading times (min): Group A [8, 11, 11, 14, 14, 17], Group B [10, 13, 13, 16, 16, 19]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

7. Reading times (min): Group A [7, 8, 8, 9, 10, 19], Group B [9, 10, 10, 11, 12, 21]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

8. Reading times (min): Group A [4, 5, 5, 6, 7, 16], Group B [6, 7, 7, 8, 9, 18]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

9. Reading times (min): Group A [5, 6, 6, 7, 8, 17], Group B [7, 8, 8, 9, 10, 19]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

10. Reading times (min): Group A [3, 4, 4, 5, 6, 15], Group B [5, 6, 6, 7, 8, 17]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

Name _____ Date _____

Statistics and Data Displays

Lesson 12 Writing a Complete Data Summary

Standards 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5c, 6.SP.B.5d

Learning target I can write a statistical summary tied to its context.

Learn and Discuss

A useful summary names the group and attribute, units, observation count, center, variability, and shape. Explain why the chosen center and spread fit the data and mention any striking value.

Example 1 Reading times in minutes are 2, 3, 3, 4, 4, 5. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.
Solution 6 observations of reading time in minutes. Mean 7/2 min, MAD 5/6 min; roughly symmetric, so mean/MAD are reasonable.. Calculate the center and spread before interpreting them in context. Other accurate, justified summaries are acceptable.
Example 2 Reading times in minutes are 8, 9, 9, 10, 11, 20. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.
Solution 6 observations of reading time in minutes. Median 19/2 min, IQR 2 min; right-skewed with a high value 20 min, so median/IQR resist that value.. Calculate the center and spread before interpreting them in context. Other accurate, justified summaries are acceptable.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 12 Writing a Complete Data Summary

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 4, 5, 5, 6, 6, 7. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

2. Reading times in minutes are 8, 9, 9, 10, 10, 11. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

3. Reading times in minutes are 2, 3, 3, 4, 4, 5. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

4. Reading times in minutes are 4, 10, 10, 16, 16, 22. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

5. Reading times in minutes are 6, 10, 10, 14, 14, 18. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

6. Reading times in minutes are 8, 14, 14, 20, 20, 26. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

7. Reading times in minutes are 6, 7, 7, 8, 9, 18. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

8. Reading times in minutes are 5, 6, 6, 7, 8, 17. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

9. Reading times in minutes are 7, 8, 8, 9, 10, 19. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

10. Reading times in minutes are 4, 5, 5, 6, 7, 16. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

Name _____ Date _____

Statistics and Data Displays

Unit 9 Test

Standards assessed 6.G.A.1, 6.G.A.2, 6.G.A.4, 6.SP.A.1, 6.SP.A.2, 6.SP.A.3, 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5c, 6.SP.B.5d, 6.SP.B.4

Questions 1–4 review Unit 8 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 5 points per question; 100 points total.

1. [Review] A parallelogram has base 5 m and perpendicular height 7 m. Sketch how it can be rearranged into a rectangle and find its area.

2. [Review] A rectangular prism has edges 2, 3 1/2, and 4 cm. Sketch it and find its volume.

3. [Review] Draw a net for a closed 2 × 3 × 6 cm rectangular prism. Label the six faces and calculate total area.

4. [Review] An L-shaped garden is a 10 m by 8 m rectangle with an 6 m by 4 m corner rectangle removed. Sketch and find the garden area.

5. [Current unit] Is “What are the heights of the plants in our garden?” statistical? Explain.

6. [Current unit] Reading times in minutes are 2, 3, 3, 4, 4, 5. Describe a typical value, range, shape, and any striking value.

7. [Current unit] Reading times in minutes are 8, 9, 9, 10, 10, 11. Report n, units, and mean.

Name _____ Date _____

Statistics and Data Displays

Unit 9 Test

Standards assessed 6.G.A.1, 6.G.A.2, 6.G.A.4, 6.SP.A.1, 6.SP.A.2, 6.SP.A.3, 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5c, 6.SP.B.5d, 6.SP.B.4

8. [Current unit] Reading times in minutes are 8, 12, 12, 16, 16, 20. Find the median. Show the middle positions.

9. [Current unit] Reading times in minutes are 8, 11, 11, 14, 14, 17. Find Q1, Q3, IQR, and range.

10. [Current unit] Reading times in minutes are 6, 10, 10, 14, 14, 18. Calculate the mean and MAD. Show all absolute deviations.

11. [Current unit] Reading times in minutes are 4, 10, 10, 16, 16, 22. Choose a center and matching variability measure. Calculate both and justify your choice.

12. [Current unit] Reading times in minutes are 7, 13, 13, 19, 19, 25. Draw a labeled dot plot. Check the number of dots.

13. [Current unit] Daily reading times in minutes: 9, 12, 17, 10, 17, 3, 7, 1, 13, 2. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes.

14. [Current unit] Reading times in minutes are 6, 7, 7, 8, 9, 18. Find the five-number summary and draw a labeled box plot. State the IQR.

Name _____ Date _____

Statistics and Data Displays

Unit 9 Test

Standards assessed 6.G.A.1, 6.G.A.2, 6.G.A.4, 6.SP.A.1, 6.SP.A.2, 6.SP.A.3, 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5c, 6.SP.B.5d, 6.SP.B.4

15. [Current unit] Reading times (min): Group A [8, 9, 9, 10, 11, 20], Group B [10, 11, 11, 12, 13, 22]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

16. [Current unit] Reading times in minutes are 3, 4, 4, 5, 6, 15. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

17. [Current unit] A survey asks “Is our school nice?” Improve it to collect numerical data with expected variation.

18. [Current unit] Reading times in minutes are 3, 4, 4, 5, 6, 15. Describe a typical value, range, shape, and any striking value.

19. [Current unit] Reading times in minutes are 2, 3, 3, 4, 5, 14. Report n, units, and mean. If one more student reads 6 minutes, find the new mean.

20. [Current unit] Reading times in minutes are 2, 3, 3, 4, 5, 14. Find the median and mean. Explain the difference in this set.

Name _____ Date _____

Final Applications and Review

Lesson 1 Designing a School Garden

Standards 6.G.A.3, 6.G.A.1

Learning target I can use coordinates and polygon areas to plan a garden.

Learn and Discuss

Read the requested quantity first and identify the relevant model. Plot vertices in order and connect them, including the last to the first. Equal x-values make a vertical side; equal y-values make a horizontal side. Count or subtract coordinates to get the side lengths. Explain why the units and the final value fit the situation.

Example 1 Sketch a triangle with base 4 cm and perpendicular height 6 cm. Find its area.
Solution 12 cm². A = bh/2 = 4 × 6 ÷ 2 = 12. Two such triangles make a parallelogram.
Example 2 A trapezoid has parallel bases 12 m and 22 m and perpendicular height 4 m. Sketch it and find its area.
Solution 68 m². A = (12 + 22) × 4 ÷ 2 = 68.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 1 Designing a School Garden

Name _____ Show calculations, models, and units.

1. Plot and connect (0,0), (10,0), (10,9), (0,9). Find the side lengths and area.

2. Sketch a triangle with base 12 cm and perpendicular height 2 cm. Find its area.

3. An L-shaped garden is a 12 m by 9 m rectangle with an 8 m by 5 m corner rectangle removed. Sketch and find the garden area.

4. A trapezoid has parallel bases 10 m and 22 m and perpendicular height 4 m. Sketch it and find its area.

5. Plot and connect (-2,-3), (5,-3), (5,5), (-2,5). Find the side lengths and area.

6. Sketch a triangle with base 6 cm and perpendicular height 7 cm. Find its area.

7. A 10 m by 9 m rectangle has a right-triangle corner removed with perpendicular legs 6 m and 3 m. Sketch the remaining polygon and find its area.

8. A trapezoid has parallel bases 10 m and 16 m and perpendicular height 2 m. Sketch it and find its area.

9. Plot and connect (-7,-6), (3,-6), (3,3), (-7,3). Find the side lengths and area. Find the perimeter too.

10. Sketch a triangle with base 14 cm and perpendicular height 7/2 cm. Find its area. Explain why the slanted side is not needed.

Name _____ Date _____

Final Applications and Review

Lesson 2 Planning Storage and Packaging

Standards 6.G.A.2, 6.G.A.4

Learning target I can connect volume and nets to compare storage designs.

Learn and Discuss

Read the requested quantity first and identify the relevant model. A rectangular prism has volume V = lwh = Bh, where B is base area. Fractional edge lengths still multiply. Use cubic units; surface area and volume measure different attributes. Explain why the units and the final value fit the situation.

Example 1 Fill a prism 3/2 × 2 × 1 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.
Solution 24 cubes; each 1/8 cubic unit; prism 3 cubic units. Counts along edges: 3, 4, 2. Product 24; 24 × 1/8 = 3, also lwh.
Example 2 Draw a net for a triangular prism. Its two congruent right-triangle bases have legs 3 cm and 4 cm and hypotenuse 5 cm; prism length is 8 cm. Label all faces and find surface area.
Solution 2 triangles (area 6 each), rectangles 3×8, 4×8, 5×8; SA 108 cm². Triangle pair: 12 cm²; rectangles: (3+4+5) × 8 = 96; total 108.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 2 Planning Storage and Packaging

Name _____ Show calculations, models, and units.

1. A rectangular prism has edges 7, 2, and 6 cm. Sketch it and find its volume.

2. Fill a prism 5/2 × 7/2 × 2 units with cubes of edge 1/2 unit. How many cubes fit? Use their volumes to verify lwh.

3. Draw a net for a closed 8 × 3 × 5 cm rectangular prism. Label the six faces and calculate total area.

4. A 5 cm by 6 cm base and 5 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

5. A square pyramid has base edge 10 cm. Each triangular face has perpendicular face height 12 cm. Draw a net and calculate total surface area.

6. A rectangular prism has edges 4, 1 1/2, and 3 cm. Sketch it and find its volume.

7. Fill a prism 2/3 × 1 × 2 units with cubes of edge 1/3 unit. How many cubes fit? Use their volumes to verify lwh.

8. Draw a net for a triangular prism. Its two congruent right-triangle bases have legs 3 cm and 4 cm and hypotenuse 5 cm; prism length is 2 cm. Label all faces and find surface area.

9. A 8 cm by 7 cm base and 6 cm height form an open-top box. Draw its net and find the material area. Ignore tabs and overlap.

10. A square pyramid has base edge 6 cm. Each triangular face has perpendicular face height 10 cm. Draw a net and calculate total surface area. Explain why the vertical pyramid height is not needed.

Name _____ Date _____

Final Applications and Review

Lesson 3 Reporting Class Reading Data

Standards 6.SP.A.1, 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5c, 6.SP.A.3, 6.SP.B.4, 6.SP.B.5d

Learning target I can represent and summarize a collection of reading data.

Learn and Discuss

Read the requested quantity first and identify the relevant model. A statistical question anticipates different answers in a collection of data. Name the group, the measured attribute, and the expected variation. A question about one fixed fact is not statistical. Explain why the units and the final value fit the situation.

Example 1 Reading times in minutes are 5, 6, 6, 7, 7, 8. Report n, units, and mean.
Solution n = 6; minutes; mean 13/2 min. Sum = 39; mean = 39 ÷ 6 = 13/2.
Example 2 Reading times in minutes are 6, 7, 7, 8, 9, 18. Find the five-number summary and draw a labeled box plot. State the IQR.
Solution (6, 7, 15/2, 9, 18); IQR 2 min. Box runs from 7 to 9, median line at 15/2, whiskers to 6 and 18.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 3 Reporting Class Reading Data

Name _____ Show calculations, models, and units.

1. Is “How many pages did each student read last night?” statistical? Explain.

2. Reading times in minutes are 6, 7, 7, 8, 8, 9. Report n, units, and mean.

3. Reading times in minutes are 6, 7, 7, 8, 8, 9. Find the median. Show the middle positions.

4. Reading times in minutes are 2, 8, 8, 14, 14, 20. Find Q1, Q3, IQR, and range.

5. Reading times in minutes are 3, 8, 8, 13, 13, 18. Calculate the mean and MAD. Show all absolute deviations.

6. Reading times in minutes are 5, 10, 10, 15, 15, 20. Draw a labeled dot plot. Check the number of dots.

7. Daily reading times in minutes: 3, 8, 3, 12, 11, 3, 18, 13, 7, 13. Draw a histogram using bins 0–4, 5–9, 10–14, and 15–19. Label axes. Which interval has the greatest frequency? Include ties.

8. Reading times in minutes are 4, 5, 5, 6, 7, 16. Find the five-number summary and draw a labeled box plot. State the IQR.

9. Reading times in minutes are 8, 9, 9, 10, 11, 20. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

10. Critique: “A question is statistical whenever it contains numbers.” Give a counterexample and a corrected rule.

Name _____ Date _____

Final Applications and Review

Lesson 4 Connecting Models and Explanations

Standards 6.G.A.1, 6.G.A.2, 6.G.A.4, 6.SP.A.2, 6.SP.A.3, 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5c, 6.SP.B.4, 6.SP.B.5d

Learning target I can select models and explain geometric and statistical results.

Learn and Discuss

Read the requested quantity first and identify the relevant model. Two matching triangles form a parallelogram, so A = (base × perpendicular height)/2. A slanted side is not necessarily the height. Label area in square units. Explain why the units and the final value fit the situation.

Example 1 A rectangular prism has edges 2, 3, and 4 cm. Sketch it and find its volume.
Solution 24 cm³. B = 2 × 3 = 6 cm²; V = B × 4 = 24 cm³.
Example 2 Reading times in minutes are 3, 4, 4, 5, 6, 15. Find the five-number summary and draw a labeled box plot. State the IQR.
Solution (3, 4, 9/2, 6, 15); IQR 2 min. Box runs from 4 to 6, median line at 9/2, whiskers to 3 and 15.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 4 Connecting Models and Explanations

Name _____ Show calculations, models, and units.

1. Sketch a triangle with base 16 cm and perpendicular height 5 cm. Find its area.

2. A rectangular prism has edges 5, 2 1/2, and 2 cm. Sketch it and find its volume.

3. A 5 cm by 4 cm base and 5 cm height form a closed box. Draw its net and find the material area. Ignore tabs and overlap.

4. Reading times in minutes are 6, 9, 9, 12, 12, 15. Describe a typical value, range, shape, and any striking value.

5. Reading times in minutes are 6, 9, 9, 12, 12, 15. Report n, units, and mean.

6. Reading times in minutes are 8, 13, 13, 18, 18, 23. Find Q1, Q3, IQR, and range.

7. Reading times in minutes are 6, 7, 7, 8, 9, 18. Calculate the mean and MAD. Show all absolute deviations. Interpret MAD in a sentence.

8. Reading times in minutes are 2, 3, 3, 4, 5, 14. Find the five-number summary and draw a labeled box plot. State the IQR.

9. Reading times (min): Group A [6, 7, 7, 8, 9, 18], Group B [8, 9, 9, 10, 11, 20]. Compare median and IQR. Which group reads longer typically? Which is more consistent?

10. Reading times in minutes are 2, 3, 3, 4, 5, 14. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

Name _____ Date _____

Final Applications and Review

Final Review Quiz

Standards assessed 6.SP.B.4, 6.G.A.1, 6.G.A.2, 6.SP.B.5c, 6.SP.B.5a, 6.SP.B.5b, 6.SP.B.5d

Questions 1–1 review Unit 9 (20%). The remaining questions assess this unit. Show work, simplify exact answers, label units, and justify models or explanations. 4 points per question; 20 points total.

1. [Review] Reading times in minutes are 7, 8, 8, 9, 9, 10. Draw a labeled dot plot. Check the number of dots.

2. [Current unit] A trapezoid has parallel bases 10 m and 14 m and perpendicular height 4 m. Sketch it and find its area.

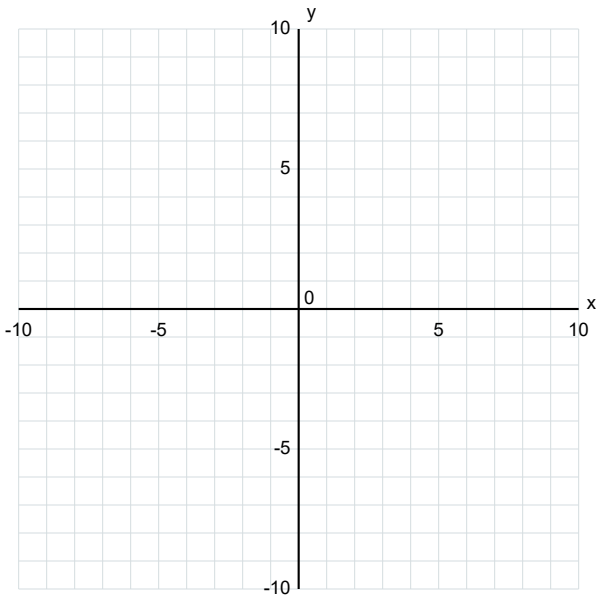
3. [Current unit] A rectangular prism has edges 1, 3, and 4 cm. Sketch it and find its volume.

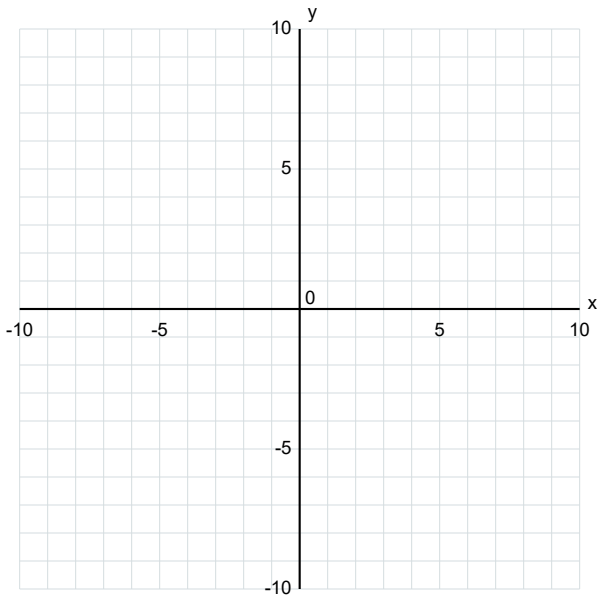
4. [Current unit] Reading times in minutes are 4, 5, 5, 6, 7, 16. Find the five-number summary and draw a labeled box plot. State the IQR.

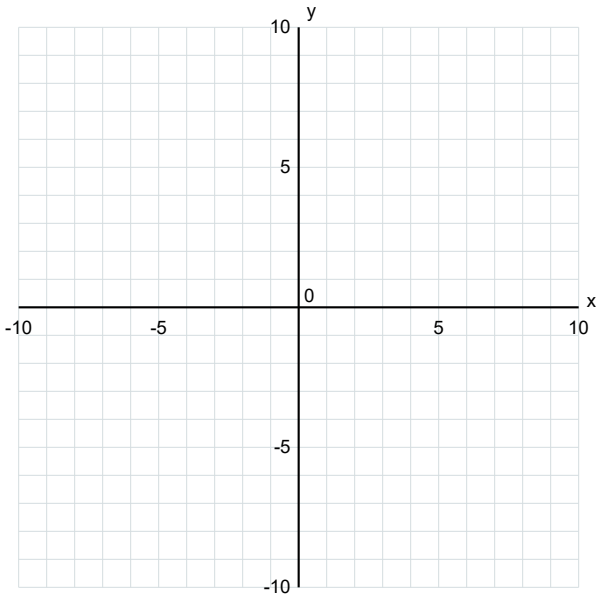
5. [Current unit] Reading times in minutes are 5, 6, 6, 7, 8, 17. Write a summary with count, attribute, units, center, variability, shape, and a justified choice of measures.

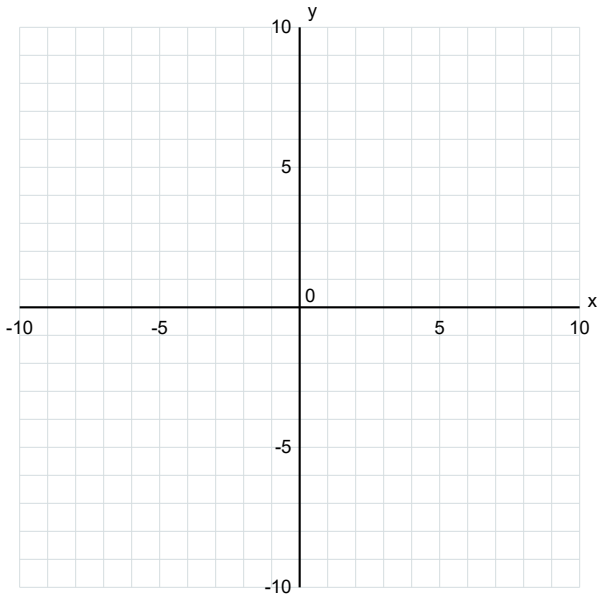
Coordinate Grid Practice

Photocopy as needed. Each small square is one unit. Add problem numbers, titles, and units.









Data Display Practice

Add your own scale and units. Use this page for dot plots, box plots, or histograms. Photocopy as needed.