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.

Materials Place-value chart, graph paper for long division, pencils.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about quotients with zero digits. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. 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. Work through the two examples on the attached instruction page. Have students name the first step before showing it.

17–22 Guided practice. Revisit worked Example 2 with its solution covered. Students propose the next step and explain why it is valid; uncover and compare with the worked solution.

22–45 Independent classwork. Assign the attached 10 questions in order. Check items 1–3 for entry-level understanding, 4–6 for connected procedures, 7–8 for representation and explanation, and 9–10 for application or justification. Ask students to use the instruction-page notes area or extra grids for longer work.

45–50 Check understanding. Use classwork question 10 as an exit discussion: A club has 9530 cards. Each full packet holds 31. How many full packets can it make, and how many cards remain? Compare the result with the answer key and ask a student to defend the method.

Support and Extension

Support Model item 1 together with the listed tools, then have students attempt item 2 independently. Watch decimal place alignment, quotient zero digits, and the difference between GCF and LCM.

Extension Ask students to solve a final item another way, draw a second representation, or create a related problem with a checked answer.

Next step Record which students can explain the target independently. Begin the next teaching session with a brief correction for any recurring error.

Name _____ Date _____

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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?

Quotients with Zero Digits

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1. 104
Reasoning 7 ÷ 7: write 1, subtract 7, remainder 0; bring down the next digit: 2 ÷ 7: write 0, subtract 0, remainder 2; bring down the next digit: 28 ÷ 7: write 4, subtract 28, remainder 0. Check: 7 × 104 = 728.

2. 301
Reasoning 9 ÷ 3: write 3, subtract 9, 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 × 301 = 903.

3. 105
Reasoning 4 ÷ 4: write 1, subtract 4, remainder 0; bring down the next digit: 2 ÷ 4: write 0, subtract 0, remainder 2; bring down the next digit: 20 ÷ 4: write 5, subtract 20, remainder 0. Check: 4 × 105 = 420.

4. 401
Reasoning 72 ÷ 18: write 4, subtract 72, remainder 0; bring down the next digit: 1 ÷ 18: write 0, subtract 0, remainder 1; bring down the next digit: 18 ÷ 18: write 1, subtract 18, remainder 0. Check: 18 × 401 = 7218.

5. 108
Reasoning 24 ÷ 23: write 1, subtract 23, remainder 1; bring down the next digit: 18 ÷ 23: write 0, subtract 0, remainder 18; bring down the next digit: 184 ÷ 23: write 8, subtract 184, remainder 0. Check: 23 × 108 = 2484.

6. 109
Reasoning 17 ÷ 16: write 1, subtract 16, remainder 1; bring down the next digit: 14 ÷ 16: write 0, subtract 0, remainder 14; bring down the next digit: 144 ÷ 16: write 9, subtract 144, remainder 0. Check: 16 × 109 = 1744.

7. 305 R 21
Reasoning 106 ÷ 35: write 3, subtract 105, remainder 1; bring down the next digit: 19 ÷ 35: write 0, subtract 0, remainder 19; bring down the next digit: 196 ÷ 35: write 5, subtract 175, remainder 21. Check: 35 × 305 + 21 = 10696.

8. 105 R 1
Reasoning 23 ÷ 22: write 1, subtract 22, remainder 1; bring down the next digit: 11 ÷ 22: write 0, subtract 0, remainder 11; bring down the next digit: 111 ÷ 22: write 5, subtract 110, remainder 1. Check: 22 × 105 + 1 = 2311.

9. 206 full packets; 13 cards remain
Reasoning 4751 = 23 × 206 + 13.

10. 307 full packets; 13 cards remain
Reasoning 9530 = 31 × 307 + 13.