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.

Materials Counters, tape-diagram space, rulers, measurement conversion chart, graph paper.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about tape diagrams and totals. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. 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. 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: 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. 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 the order of ratio labels, part-to-whole denominators, and scaling only one quantity.

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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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.

Tape Diagrams and Totals

Ratios and Measurement

1. 32 oaks and 28 pines
Reasoning 15 equal sections total; each section is 60 ÷ 15 = 4.

2. 4 oaks and 4 pines
Reasoning 4 equal sections total; each section is 8 ÷ 4 = 2.

3. 6 oaks and 9 pines
Reasoning 5 equal sections total; each section is 15 ÷ 5 = 3.

4. 24 oaks and 8 pines
Reasoning 8 equal sections total; each section is 32 ÷ 8 = 4.

5. 14 oaks and 14 pines
Reasoning 14 equal sections total; each section is 28 ÷ 14 = 2.

6. 36 oaks and 30 pines
Reasoning 11 equal sections total; each section is 66 ÷ 11 = 6.

7. 6 oaks and 6 pines; difference 0
Reasoning 6 equal sections total; each section is 12 ÷ 6 = 2.

8. 16 oaks and 16 pines; difference 0
Reasoning 8 equal sections total; each section is 32 ÷ 8 = 4.

9. 12 oaks and 6 pines; difference 6
Reasoning 6 equal sections total; each section is 18 ÷ 6 = 3.

10. 12 oaks and 15 pines; difference 3
Reasoning 9 equal sections total; each section is 27 ÷ 9 = 3.