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.

Materials Fraction strips, blank fraction bars, pencils.

Lesson Flow 50 Minutes

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

5–17 Teach and model. 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. 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 equation 1/2 × n = 1/8 represents equally sized portions. Find n, write the related division equation, and check. 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 for taking the reciprocal of the dividend, confusing a partial group with a fraction of the whole, and rounding full-container counts upward.

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 _____

Fraction Operations and Models

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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.

Missing Factors and Quotients

Fraction Operations and Models

1. n = 1; 1/4 ÷ 1/4 = 1
Reasoning 1/4 ÷ 1/4 = 1/4 × 4 = 1. Check: 1/4 × 1 = 1/4.

2. n = 3; 3/4 ÷ 1/4 = 3
Reasoning 3/4 ÷ 1/4 = 3/4 × 4 = 3. Check: 1/4 × 3 = 3/4.

3. n = 2; 1/2 ÷ 1/4 = 2
Reasoning 1/2 ÷ 1/4 = 1/2 × 4 = 2. Check: 1/4 × 2 = 1/2.

4. n = 2; 3 ÷ 3/2 = 2
Reasoning 3 ÷ 3/2 = 3 × 2/3 = 2. Check: 3/2 × 2 = 3.

5. n = 7/6; 7/8 ÷ 3/4 = 7/6
Reasoning 7/8 ÷ 3/4 = 7/8 × 4/3 = 7/6. Check: 3/4 × 7/6 = 7/8.

6. n = 16/15; 8/3 ÷ 5/2 = 16/15
Reasoning 8/3 ÷ 5/2 = 8/3 × 2/5 = 16/15. Check: 5/2 × 16/15 = 8/3.

7. n = 3; 3/5 ÷ 1/5 = 3
Reasoning 3/5 ÷ 1/5 = 3/5 × 5 = 3. Check: 1/5 × 3 = 3/5.

8. n = 12/5; 3/5 ÷ 1/4 = 12/5
Reasoning 3/5 ÷ 1/4 = 3/5 × 4 = 12/5. Check: 1/4 × 12/5 = 3/5.

9. n = 1/8; 1/8 ÷ 1 = 1/8
Reasoning 1/8 ÷ 1 = 1/8 × 1 = 1/8. Check: 1 × 1/8 = 1/8.

10. n = 1/4; 1/8 ÷ 1/2 = 1/4
Reasoning 1/8 ÷ 1/2 = 1/8 × 2 = 1/4. Check: 1/2 × 1/4 = 1/8.