

LESSON 3

Objective

Determine a ratio and use the ratio to solve a proportion.

Common Core State Standards

- **6.RP.3b** Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*

Ratios and Proportional Relationships

Ratio and Proportion: Finding the Ratio

Students have dealt with ratios and proportions, in the form of fraction notation, in previous lessons and grades. For example, 2 to 5 is expressed as 2:5 in ratio notation and $\frac{2}{5}$ in fraction notation. A *proportion* is a statement of equality between two ratios. In this lesson, students will use a proportion to determine an unknown quantity.

Try It! Perform the Try It! activity on the next page.

Talk About It

Discuss the Try It! activity.

- **Ask:** What is a ratio? Give an example.
- **Ask:** What is a proportion? Give an example.
- **Ask:** How did you determine the ratio of pints to square feet covered? How did you set up your proportion?
- **Ask:** How did you solve the proportion?

Solve It

Reread the problem with students. Have them determine the ratio between pints of paint and square feet covered. Have students use their ratio to determine the unknown value of a proportion.

More Ideas

For other ways to teach about ratio and proportion—

- Have students repeat this activity by creating the same rectangles on their XY Coordinate Pegboard.
- Have students extend this activity by using proportions to convert the pints mentioned in the story problem into quarts or gallons.

Formative Assessment

Have students try the following problem.

What are the two ratios in the proportion shown here? What is the value of x ?

$$\frac{1}{4} = \frac{x}{8}$$

A. $\frac{1}{4}, \frac{x}{8}; 2$

B. $\frac{x}{4}, \frac{8}{4}; 8$

C. $\frac{1}{x}, \frac{4}{8}; 4$

D. $\frac{4}{1}, \frac{8}{x}; 2$

Try It! 20 minutes | Groups of 3

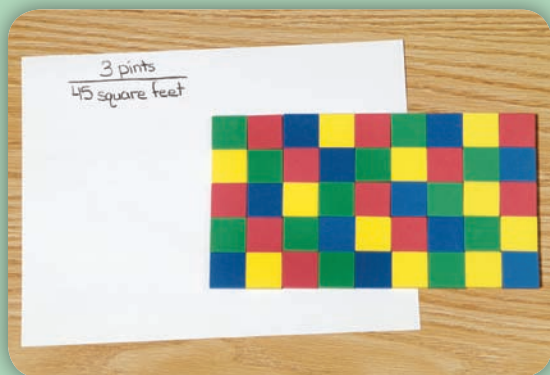
Here is a problem about ratios and proportions.

Felicia is painting the deck of a porch with a textured paint that adds traction to slippery surfaces. She remembers that on a previous project it took 3 pints of paint to cover an area of 45 square feet. What was the ratio of pints to square feet for that job? How many pints will she need for this porch, which has an area of 75 square feet?

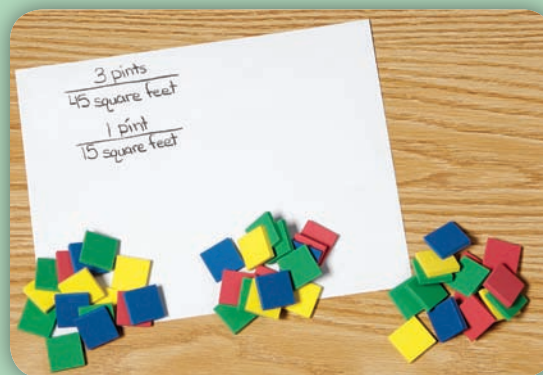
Introduce the problem. Then have students do the activity to solve the problem. Distribute Color Tiles to students.

Materials

- Color Tiles (75 per group)

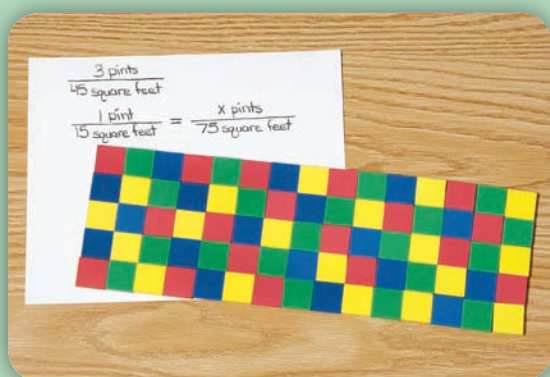


1. Have students make a “porch” surface with 45 Color Tiles. **Ask:** How many pints of paint are needed to cover 45 square feet? Write this information as a ratio.

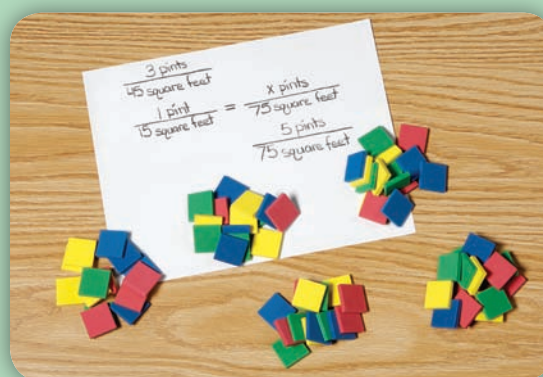


2. Ask: Based on this ratio, how many square feet will 1 pint of paint cover? Have students divide their tiles into three equal groups.

Say: Write this information as a ratio.



3. Ask: What is the area, in square feet, of the porch being painted? Have students make a “porch” with 75 Color Tiles.

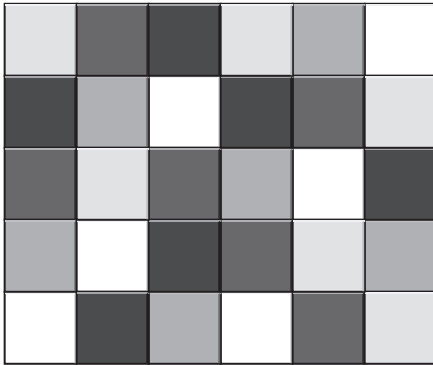


4. Ask: If 1 pint of paint covers 15 square feet, how many pints will Felicia need to cover 75 square feet? Have students write a proportion reflecting this information and solve the problem.

Use Color Tiles to model the rectangle shown. Use the ratio represented to write and solve a proportion for the problem.

(Check students' work.)

1. 5 yards of fabric made a banner that was 30 square feet.



How many yards of fabric are needed to make a banner that is 120 square feet?

$$\frac{5}{30} = \frac{x}{120}$$

$$20$$

Using Color Tiles, model a rectangle for the ratio described. Sketch the model. Then write a proportion to solve the problem.

2. 4 cups of flour made 28 dozen cookies.

How many cups of flour are needed to make 35 dozen cookies?

$$\frac{4}{28} = \frac{x}{35}$$

$$5$$

Solve each proportion.

3. $\frac{7}{1} = \frac{49}{7}$

4. $\frac{8}{10} = \frac{28}{35}$

5. $\frac{2}{3} = \frac{12}{18}$

6. $\frac{2}{12} = \frac{10}{60}$

7. $\frac{3}{7} = \frac{12}{28}$

8. $\frac{1}{3} = \frac{12}{36}$

Answer Key

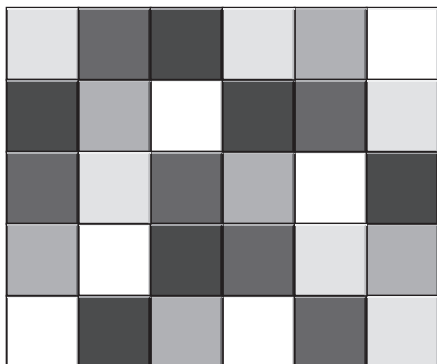
Challenge! If you use a proportion to solve a scale factor problem related to a map, given the scale factor is 1 in. = 12 mi, how do you use the actual distance of 180 miles to find the distance on the map? Write the proportion.

Challenge: (Sample) The 180 miles must be placed in the same position of the fraction as the 12 miles was placed, but in the other fraction; $\frac{1}{12} = \frac{?}{180}$. The numerators in the fractions represent the distances on the map and the denominators in the fractions represent the actual distances.

[illegible]

Use Color Tiles to model the rectangle shown. Use the ratio represented to write and solve a proportion for the problem.

1. 5 yards of fabric made a banner that was 30 square feet.



How many yards of fabric are needed to make a banner that is 120 square feet?

_____ = _____

Using Color Tiles, model a rectangle for the ratio described. Sketch the model. Then write a proportion to solve the problem.

2. 4 cups of flour made 28 dozen cookies.

How many cups of flour are needed to make 35 dozen cookies?

_____ = _____

Solve each proportion.

3. $\frac{7}{1} = \frac{49}{x}$

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6. $\frac{2}{x} = \frac{10}{60}$

7. $\frac{x}{7} = \frac{12}{28}$

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Challenge! If you use a proportion to solve a scale factor problem related to a map, given the scale factor is 1 in. = 12 mi, how do you use the actual distance of 180 miles to find the distance on the map? Write the proportion.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.