6–3 Proportions

MAIN IDEA

- Determine if two ratios are proportional.

BUILD YOUR VOCABULARY (pages 144–145)

Two quantities are **proportional** if they have a constant ratio or rate.

A **proportion** is an equation stating that two ratios or rates are equivalent.

EXAMPLES Use Unit Rates

Determine if the quantities in the pair of ratios or rates are proportional. Explain your reasoning and express each proportional relationship as a proportion.

1 **20 rolls for \$5; 48 rolls for \$12**

Write each rate as a fraction. Then find its unit rate.

$$\frac{\$5}{20 \text{ rolls}} \overset{\div 5}{\underset{\div 5}{=}} \boxed{} \qquad \frac{\$12}{48 \text{ rolls}} \overset{\div 12}{\underset{\div 12}{=}} \boxed{}$$

Since the rates have the same unit rate, they are equivalent. The cost is proportional to the number of rolls.

So, $\boxed{} = \boxed{}$.

2 **42 people on 7 teams; 64 people on 8 teams**

$$\frac{42 \text{ people}}{7 \text{ teams}} \overset{\div 7}{\underset{\div 7}{=}} \boxed{} \qquad \frac{64 \text{ people}}{8 \text{ teams}} \overset{\div 8}{\underset{\div 8}{=}} \boxed{}$$

Since the rates do not have the same unit rate, they are not equivalent. So, the number of people is $\boxed{}$ to the number of teams.

3 **FOOD** **You can buy 3 medium pizzas at The Pizza Place for $18 or 5 medium pizzas for $30. Are these selling rates proportional? Explain your reasoning.**

$$\frac{\$18}{3 \text{ pizzas}} \overset{\div 3}{\underset{\div 3}{=}} \boxed{} \qquad \frac{\$30}{5 \text{ pizzas}} \overset{\div 5}{\underset{\div 5}{=}} \boxed{}$$

Since the unit rates are the same, ____, the rates are equivalent. So, the selling rates are proportional.

Check Your Progress **Determine if the quantities in the pair of ratios or rates are proportional. Explain your reasoning and express each proportional relationship as a proportion.**

a. 18 cookies for $6; 24 cookies for $8

b. 16 students with 8 teachers; 30 students with 10 teachers

c. **FOOD** At a farmer's market, one farmer is selling 6 pumpkins for $12. Another farmer is selling his pumpkins 10 for $20. Are these selling rates proportional? Explain your reasoning.

EXAMPLES Use Equivalent Fractions

Determine if the quantities in the pair of ratios or rates are proportional. Explain your reasoning.

4 **5 laps swum in 8 minutes; 11 laps swum in 16 minutes**

Write each ratio as a fraction.

$$\frac{5 \text{ laps}}{8 \text{ minutes}} \overset{?}{=} \frac{11 \text{ laps}}{16 \text{ minutes}}$$

$\times 2\frac{1}{5}$

$\times 2$

The numerator and the denominator are not multiplied by the same number. So, the fractions are not equivalent.

Since _____ ≠ _____, the number of laps swum is not proportional to the number of minutes.

5 **8 corrals with 56 horses; 4 corrals with 28 horses**

$$\frac{8 \text{ corrals}}{56 \text{ horses}} \overset{?}{=} \frac{4 \text{ corrals}}{28 \text{ horses}}$$

The numerator and the denominator are divided by the same number. So, the fractions are equivalent.

Since _____ = _____, the number of corrals is proportional to the number of horses.

Check Your Progress **Determine if the quantities in the pair of ratios or rates are proportional. Explain your reasoning.**

a. 2 classes taken in 5 hours; 8 classes taken in 15 hours

b. 10 cages with 25 birds; 2 cages with 5 birds

HOMEWORK ASSIGNMENT

Page(s):

Exercises: