6-1 Ratios and Rates - Practice and Problem Solving

Write each ratio as a fraction in simplest form. Then explain its meaning.

9.

sandwiches to milk cartons

There are 4 sandwiches and 10 milk cartons in the picture.

$$\frac{4}{10} = \frac{2}{5}$$

For every 2 sandwiches, there are 5 milk cartons.

11. CARS Audrey counted 6 motorcycles and 27 cars at the restaurant parking lot. Find the ratio of motorcycles to cars.

$$\frac{6}{27} = \frac{2}{9}$$

For every 2 motorcycles, there were 9 cars.

13. ANIMALS An animal shelter has 36 kittens and 12 puppies available for adoption. What is the ratio of puppies to kittens?

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

For every 1 puppy, there are 3 kittens available for adoption.

15. **ANALYZE TABLES** Last week, a wireless phone company sold the cell phone covers listed in the table. Find the ratio of black cell phone covers to the total number of cell phone covers sold last week. Then explain its meaning.

Color	Number of Cell Phone Covers
Green	5
Silver	6
Red	3
Black	4

The total number of cell phone covers sold was
5 + 6 + 3 + 4 or 18. The number of black cell phone covers sold was 4.

$\dfrac{4}{18} = \dfrac{2}{9}$, or 2 to 9, or 2:9

Every 2 out of 9 cell phone covers sold last week was black.

17. **FOOD DRIVE** On the first day of the food drive, Mrs. Teasley's classes brought in 6 cans of fruit, 4 cans of beans, 7 boxes of noodles, and 4 cans of soup. Find the ratio of cans of fruit to the total number of food items collected. Then explain its meaning.

The total number of food items collected was
6 + 4 + 7 + 4 or 21.
The number of cans of fruit was 6.

$\dfrac{6}{21} = \dfrac{2}{7}$, or 2 to 7, or 2:7

Two out of every 7 food items donated was a can of fruit.

Write each ratio as a unit rate.

19. $36 for 4 tickets

$$\dfrac{\$36}{4 \text{ tickets}} = \dfrac{\$9}{1 \text{ ticket}}$$

or $9 per ticket

21. $3 for a dozen eggs

$$\dfrac{\$3}{12 \text{ eggs}} = \dfrac{\$0.25}{1 \text{ egg}}$$

$0.25 per egg

23. **RECYCLING** 340 trees are saved by recycling 20 tons of paper. How many trees are saved from 1 ton of recycled paper?

$$\frac{\text{trees saved}}{\text{tons of paper recycled}} \rightarrow \frac{340 \text{ trees}}{20 \text{ ton}}$$

$$\rightarrow \frac{(340 \text{ trees}) \div 20}{(20 \text{ ton}) \div 20}$$

$$\rightarrow \frac{17 \text{ trees}}{1 \text{ ton}}$$

Seventeen trees are saved by 1 ton of recycled paper.

ANALYZE GRAPHS Use the graphic. Write each ratio in simplest form. Then explain its meaning.

Stanley Cup Finals, 1915-2006
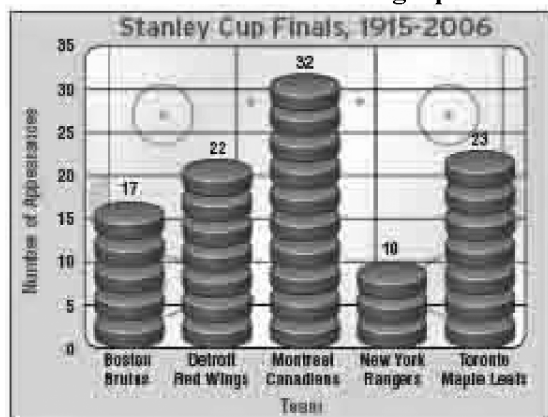
Source: National Hockey League

25. Write the ratio that compares the appearances made by the Maple Leafs to the appearances made by the Bruins.

$$\frac{\text{Maple Leafs}}{\text{Bruins}} \rightarrow \frac{23}{17}$$

The ratio is $\frac{23}{17}$, 23 to 17, or 23:17.

27. **PACKAGING** A 6-pack of bottled water is on sale for $3. The same bottled water is also available in a 24-pack for $10. Which is the least expensive per bottle: the 6-pack or the 24-pack? Explain your reasoning.

Find the cost per bottle for the 6-pack.

$$\frac{\text{cost}}{\text{bottle}} \rightarrow \frac{\$3}{6 \text{ bottle}}$$

$$\rightarrow \frac{\$0.50}{1 \text{ bottle}}$$

Find the cost per bottle for the 24-pack.

$$\frac{\text{cost}}{\text{bottle}} \rightarrow \frac{\$10}{24 \text{ bottle}}$$

$$\rightarrow \frac{\$0.42}{1 \text{ bottle}}$$

The 24-pack is less expensive per bottle.

29. **CHALLENGE** Student Council sold 8 tickets to the spring dance in 15 minutes. At this rate, how many tickets will they sell per hour.

$$\frac{8 \text{ tickets}}{15 \text{ minutes}} \rightarrow \frac{(8 \text{ tickets}) \cdot 4}{(15 \text{ minutes}) \cdot 4}$$

$$\rightarrow \frac{32 \text{ tickets}}{60 \text{ minutes}}$$

$$\rightarrow \frac{32 \text{ tickets}}{1 \text{ h}}$$

They will sell 32 tickets per hour.

31. **WRITING IN MATH** What is the difference between a ratio and a rate? Give two examples of each.

A ratio is a comparison of two quantities by division; for example, $\frac{2 \text{ students}}{13 \text{ students}}$ and $\frac{5 \text{ birds}}{27 \text{ pets}}$. A rate also compares two quantities by division; however, the quantities of a rate have different kinds of units. For example, $\frac{60 \text{ miles}}{6 \text{ hours}}$ and $\frac{\$45}{2 \text{ tickets}}$.

33. The table shows the age ranges of the guests at Margo's birthday party. Which ratio accurately compares the number of guests ages 15 to 40 to the total number of guests at the party?

Age Range	Number of Guests
Under 15	11
15-40	6
41-65	3
Over 65	2

F 1:2
G 3:22
H 1:11
J 3:11

The total number of guests was 11 + 6 + 3 + 2 or 22. The number of guests ages 15 to 40 was 6.

$$\frac{6}{22} = \frac{3}{11}$$

The answer is J.

Divide. Write in simplest form.

35. $\dfrac{1}{8} \div \dfrac{1}{6}$

$$\frac{1}{8} \div \frac{1}{6} = \frac{1}{8} \times \frac{6}{1}$$

$$= \frac{1}{4} \times \frac{3}{1}$$

$$= \frac{3}{4}$$

37.

$$5\frac{5}{8} \div 2\frac{1}{2}$$

$$5\frac{5}{8} \div 2\frac{1}{2} = \frac{45}{8} \div \frac{5}{2} = \frac{45}{8} \times \frac{2}{5}$$

$$= \frac{9}{4} \times \frac{1}{1}$$

$$= \frac{9}{4}$$

$$= 2\frac{1}{4}$$

39. **DECORATING** Janie is arranging a bookshelf, a chair, and a dresser along one wall of her bedroom. Use the *make a list* strategy to find the number of ways Janie can arrange the furniture.

bookshelf - chair - dresser
bookshelf - dresser - chair
chair - dresser - bookshelf
chair - bookshelf - dresser
dresser - bookshelf - chair
dresser - chair - bookshelf
Janie can arrange the furniture in 6 ways.

PREREQUISITE SKILL Write each fraction in simplest form.

41. $\frac{15}{18}$

$$\frac{15}{18} = \frac{15 \div 3}{18 \div 3}$$

$$= \frac{5}{6}$$

43. $\frac{25}{35}$

$$\frac{25}{35} = \frac{25 \div 5}{35 \div 5}$$

$$= \frac{5}{7}$$