2.6 Write Ratios & Proportions2.7 Solve Proportions UsingCross Products

A ratio uses division to compare two quantities.

$$a ext{ to } b$$
 $a : b$ $\frac{a}{b}$

Each of the above is read "the ratio of a to b."

Ratios should always be in SIMPLEST FORM.

- 1. A baseball team plays 12 home games and 16 away games.
 - a) Find the ratio of <u>away games</u> to home games.

$$\frac{16 \div 4}{12 \div 4} = \boxed{\frac{4}{3}}$$

b) Find the ratio of home games to all games played.

$$\frac{12\div 4}{29\div 4}=\boxed{\frac{3}{7}}$$

- There are 18 ninth graders and
 14 tenth graders in a class.
 - a) Find the ratio of ninth graders to tenth graders.

$$\frac{18 \div 2}{14 \div 2} = \boxed{\frac{9}{7}}$$

b) Find the ratio of tenth graders to all students.

$$\frac{14 \div 2}{32 \div 2} = \boxed{\frac{7}{16}}$$

A proportion is an equation that states that two ratios are equivalent.

$$\frac{a}{b} = \frac{c}{d}$$
 where $b \neq 0$, $d \neq 0$
 $cross-mult[ply-solve each proportion]$

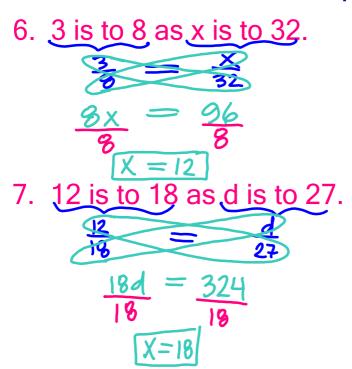
$$\frac{7W = 140}{7}$$

 $W = 20$

$$\frac{2m}{2} = \frac{108}{2}$$

$$\frac{92}{9} = \frac{270}{9}$$

Write the sentence as a proportion & solve.



There are different ways to set up proportions when solving word problems.

8. A recipe for salsa calls for 30 tomatoes to make 12 pints of salsa. How many tomatoes are needed to make 4 pints of salsa?

$$\frac{30 \text{ tom.}}{12 \text{ pints}} = \frac{4 \text{ pints}}{30 \text{ tom.}} = \frac{4 \text{ pints}}{x}$$

$$\frac{12 \text{ pints}}{4 \text{ pints}} = \frac{30 \text{ fom.}}{x}$$

$$\frac{12x = 120}{12}$$

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9. A backpacker in the Appalachain Mountains hikes 5.5 miles in 2 hours. If the hiking rate remains the same, how far will the backpacker hike in 7 hours? Solve using a proportion.

$$\frac{5.5 \text{miles}}{2 \text{miles}} = \frac{36.5}{2}$$

$$\chi = 10.25 \text{ miles}$$

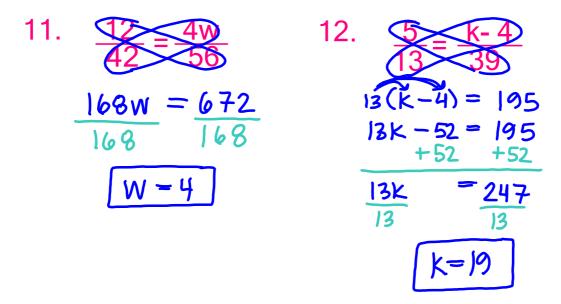
10. When two full moons appear in the same month, the second full moon is called a blue moon. On average, 2 blue moons occur every 5 years. Find the number of blue moons that are likely to occur in the next 25 years using a proportion.

2 blve mous
$$x$$

5 yrs 25 yrs

 $5x = 50$
 5
 $x = 10$ blve moons

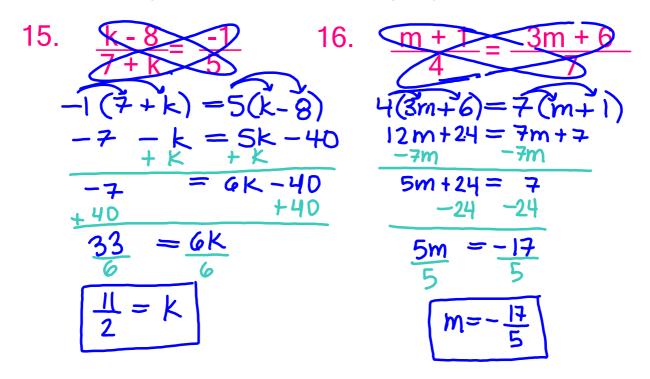
Let's try a few that look slightly different.



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13.
$$6+n=15$$
 $90(6+n) = 900$
 $540 + 90n = 900$
 -540
 $90n = 360$
 $90 = 900$
 $1.2 = 3.96$
 $1.2 = 3.96$
 $1.2 = 3.96$
 $1.2 = 3.3$

Let's try a few that look slightly different.



17. The ship model kits sold at a hobby store have a scale of 1 ft: 600 ft. A completed model of the Queen Elizabeth II is 1.6 feet long. Estimate to the nearest foot the actual length of the Queen Elizabeth II.

model
$$ft$$
 1.6ft teal 600ft $X = 960ft$