Warm Up

10/23

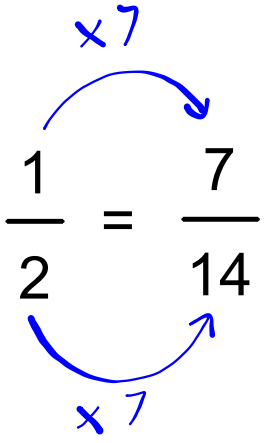
Go to:

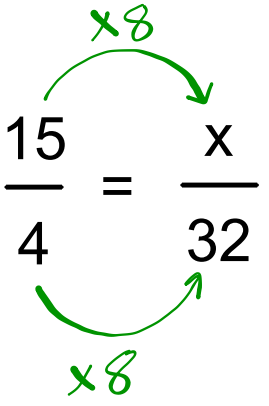
Google Classroom

for a Notebook Check

(All about setting up equivalent fractions.)

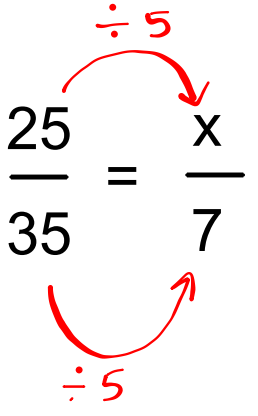
Proportion is an equation where two ratios are equal!





$x = 15 \cdot 8$

$x = 120$



$x = 25 \div 5$

$x = 5$

What if it's not so easy to scale up or down?

$$\frac{13}{4} = \frac{x}{7}$$

×1.75 (numerator 13 → x), ×1.75 (denominator 4 → 7)

$x = 13(1.75)$

$x = 22.75$

Let's use Algebra!

$$\frac{13}{4} = \frac{x}{7}$$

$$(7)\ \frac{13}{4} = \frac{x}{7}\ (7)$$

$22.75 = x$

How to do this on our calculator:

[7] [×] [13] [÷] [4] [=]

How do we set up a proportion?

12 inches in one foot, how many feet is 90 inches?

Key

inches
feet

$$\frac{12\text{ in}}{1\text{ ft}} = \frac{90}{x}$$

×7.5 ÷7.5

Scaling Up

$7.5 = x$

Or solve algebraically

$$\frac{12\text{ inches}}{1\text{ foot}} = \frac{90}{x}$$

uncomfortable with x in the denominator

Let's flip the key!

$\frac{1\text{ foot}}{12\text{ inches}}$

$$(90)\ \frac{1}{12} = \frac{x}{90}\ \frac{(90)}{1}$$

$7.5 = x$

7.5 feet = 90 inches

Ms. L-C regularly makes 40 ounces of lemonade, which is 10 servings.

She needs 21 servings for her son's Cub Scout meeting. How many ounces of lemonade does she need to make?

What do we know? $\frac{40 \text{ ounces}}{10 \text{ servings}}$

$\frac{\text{ounces}}{\text{servings}}$

What do we want to know?

How many ounces for 21 servings?

$(21)\frac{40}{10} = \frac{x}{21}(21)$

$84 = x$

Ms. L-C needs to make 84 ounces of lemonade

Other ways:

Equiv Fraction

$\times 4\left(\frac{40 \text{ ounces}}{10 \text{ servings}} = \frac{x \text{ ounces}}{21 \text{ servings}}\right)\times 4$

$x = 84$ ounces

$\times 2.1$

$\frac{40 \text{ ounces}}{10 \text{ servings}} = \frac{x \text{ ounces}}{21 \text{ servings}}$

$\times 2.1$

$40 \cdot 2.1 = 84$ ounces

A girl scout troop uses 14 flashlight batteries on a three-night camping trip.

If they are planning a seven-night trip, how many batteries should they bring?

Key $\boxed{\frac{\#\text{ batteries}}{\#\text{ of nights}}}$

what we know / what we need to solve

$(7)\ \boxed{\frac{14}{3}} = \boxed{\frac{x}{7}}\ (7)$

$32.7 = x$

They need 33 batteries

More Practice

Proportions Practice

For each problem, make a key. Then write the proportion and solve. Be sure to include units in your answer.

1.) Three pumps can remove a total of 1700 gallons of water per minute from a flooded mineshaft. If engineers want to remove at least 5500 gallons per minute, how many pumps will they need operating?

2.) Geologists in Antarctica find an average of 7 meteorite fragments in every 500 tons of gravel they sift through. How much gravel must they sift through in order to get 100 fragments?

3.) The ratio of boys to girls in Ms. Alper's math classes is $5 : 7$. If there are 60 students in all of her classes, how many are boys?

4.) A cookie recipe calls for 3 eggs and makes 4 dozen cookies.

a. How many (dozen) cookies could you make with a dozen eggs?

b. How many eggs would you need to make 18 dozen cookies?

Three pumps can remove a total of 1700 gallons of water per minute from a flooded mineshaft. If engineers want to remove at least 5500 gallons per minute, how many pumps will they need operating?

Key: $\frac{\text{pumps}}{\text{gallons}}$

$$(5500)\frac{3}{1700} = \frac{x}{5500}(5500)$$

$$9.7 = x$$

They will need 10 pumps.

Geologists in Antarctica find an average of 7 meteorite fragments in every 500 tons of gravel they sift through.

How much gravel must they sift through in order to get 100 fragments?

Key: $\frac{\text{Fragments}}{\text{tons of gravel}}$

If we use this as our key, we would be solving for x in the denominator which makes things more difficult

$\frac{\text{tons of gravel}}{\text{\# fragments}}$

Flip the ratio to make your life easier!

$$(100)\ \frac{500}{7} = \frac{x}{100}\ (100)$$

$$7142.9 = x$$

$\sim$ 7143 tons of gravel

The ratio of boys to girls in Ms. Alper's math classes is 5 : 7. If there are 60 students in all of her classes, how many are boys?

Key: $\frac{\#\text{ boys}}{\text{total students}}$

5:7
boys : girls

5 boys out of a total of 12 students

$$\frac{5}{12} = \frac{x}{60}$$

5.) A case of 24 tennis balls weighs 3 pounds. How much would a shipment of 2560 tennis balls weigh?

6.) A map of Connecticut is drawn to a scale where 2 inches on the map represents 35 miles.

a. If Greenwich and Stonington are 105 miles from each other, how far apart do they appear on the map?

b. On this same map the road from Mystic to Hartford is 1½ inches long. How far apart are Mystic and Hartford?

7.) A bag of 8 apples costs $1.50 at Sam's Orchard.

a. At this same rate, how much would 18 apples cost?

b. How many apples could you buy for $5.00?

c. What is the unit cost per apple?

8.) Emily can ride her scooter 18 miles in 50 minutes.

a. At this same rate (speed) how far can she ride in two hours?

b. How long would it take for her to ride 4 miles?

c. What is her unit rate in miles per hour?

9.) Will's Widget Works can produce 2½ tons of widgets in an 8 hour work day.

a. How many widgets can Will's Widget Works produce between 9 am and noon?

b. McGee Manufacturing, Inc. needs to order 17 tons of widgets. How many work days will it take Will's Widget works to fill this order?

10.) The Jakobshavn Glacier in Greenland, reputed to be the fastest in the world, has sped up lately (perhaps due to global warming?). The last accurate measurements have it travelling at 5.25 kilometers (5250 meters) in a five month period. At this rate, how far does it travel in a year?

Homework

Finish classwork