

**Warm Up**

10/25

<b>ESROH</b> <b>Riding</b>	KNEE UR FULL OF	<b>faredce</b>
##### weight	evarelto	<b>N</b> <b>I</b> <b>A</b> <b>C</b> <b>A</b> <b>P</b> <b>T</b>
doubles doulebs duboles	<b>DO(12")OR</b>	<b>the weather</b> <b>feeling</b>

# Proportions

(All about setting up equivalent fractions.)

Proportion is an equation where two ratios are equal!

$$\frac{1}{2} = \frac{7}{14}$$

*x7*

*x7*

scaling up

Solve this proportion:

$$\frac{15}{4} = \frac{x}{32}$$

*x8*

*x8*

$$x = 15 \cdot 8$$
$$= 120$$

$$\frac{25}{35} = \frac{x}{7}$$

*÷5*

*÷5*

$$x = \frac{25}{5}$$

$$x = 5$$

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

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

What makes this difficult to scale up or down?

we don't have a whole number to scale up with

We need to use Algebra!

$$\frac{13}{4} = \frac{x}{7} \quad \left. \vphantom{\frac{13}{4}} \right\} x \text{ is being divided by } 7$$

$$\frac{(7)}{1} \frac{13}{4} = \frac{x}{7} \frac{(7)}{1} \quad \left. \vphantom{\frac{(7)}{1}} \right\} \text{to undo we need to multiply both sides by } 7.$$

$$22.75 = x$$

on your calculator:  $(7) \left( \frac{13}{4} \right)$

$$13 \div 4 \cdot 7$$

$$13 \cdot 7 \div 4$$

Or see if there is a decimal scale factor

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

$\times 1.75$

$$7 \div 4 = 1.75$$

$$x = 22.75$$

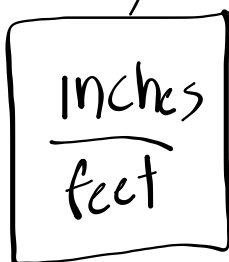
# How do we set up a proportion?

we know

trying to figure out

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

Key



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

If you don't like your unknown in the denominator switch your key



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

A red arrow labeled "x 7.5" points from the denominator "12 inches" to the numerator "X feet". Another red arrow labeled "x 7.5" points from the denominator "90 inches" to the numerator "1 foot".

$$\frac{1}{12} = \frac{7.5}{90}$$

$$X = 7.5$$

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?  $\frac{40 \text{ ounces}}{10 \text{ servings}}$

What do we want to know?  $\frac{x \text{ ounces}}{21 \text{ servings}}$

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

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

$\times 2.1$

$x = 84$

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?

$$\frac{\# \text{ batteries}}{\# \text{ nights}}$$

we know  
↓

$$\frac{14 \text{ batteries}}{3 \text{ nights}} = \frac{x \text{ batteries}}{7 \text{ nights}}$$

$$\frac{14}{3} = \frac{x}{7}$$

*x2.3* (curved arrow from 14 to x)

*x2.3* (curved arrow from 3 to 7)

$$x = 32.2$$

They should bring 33 batteries

More Practice





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:

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

we know

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

$\times 3.2$

$\times 3.2$

$$\frac{5500}{1700} = 3.2$$

How many pumps

$$3 \cdot 3.2 = 9.6$$

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: 

$\frac{\text{fragments}}{\text{tons}}$
--

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

$\times 14.29$  (above the fraction)  
 $\times 14.29$  (below the fraction)

$$\frac{100}{7} = 14.29$$

$$\begin{aligned} x &= 500 (14.29) \\ &= 7145 \text{ tons} \end{aligned}$$

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?

# of boys ←      ← # of girls

Key:

$$\frac{\text{Total \# of students}}{\text{Total \# of boys}}$$

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

$$\swarrow \nearrow$$

x5

$$x = 5(5)$$
$$= 25$$

25 boys out of 60 students

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  $1\frac{1}{2}$  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  $2\frac{1}{2}$  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