

Key

Notes on Proportions

Take a look at the proportions below...

$$\frac{4}{16} = \frac{1}{4}$$

$$16 = 16 \checkmark$$

$$\frac{8}{20} = \frac{2}{5}$$

$$40 = 40 \checkmark$$

$$\frac{2}{3} = \frac{6}{9}$$

$$18 = 18 \checkmark$$

1. What pattern do you notice about the "cross products" in each proportion? (Cross Product means when you cross multiply)

cross products are the same

2. Write a proportion of your own by finding two equivalent fractions.

$$\frac{1}{2} = \frac{11}{22}$$

3. Test the pattern you found in #1 with the proportion that you wrote in #2. Is the pattern still the same?

$$1 \cdot 22 = 2 \cdot 11$$

$$22 = 22 \checkmark$$

Multiplication Property of Equality: You can multiply anything to an equation, as long as it is the same number multiplied to BOTH SIDES of the equation.

Multiply each side by the denominators

$$4 \cdot 16 \cdot \frac{4}{16} = \frac{1}{4} \cdot 4 \cdot 16$$

$$16 = 16 \checkmark$$

$$5 \cdot 20 \cdot \frac{8}{20} = \frac{2}{5} \cdot 5 \cdot 20$$

$$40 = 40 \checkmark$$

We can use this property to determine if a pair of ratios form a proportion (if the fractions are equal).

Do each of the following ratios form a proportion? Use the "SHORT CUT."

1. $\frac{9}{20} = \frac{2}{5}$

$$45 \neq 40$$

No

2. $\frac{3}{7} = \frac{9}{21}$

$$63 = 63$$

Yes

3. $\frac{11}{5} = \frac{22}{9}$

$$99 \neq 110$$

No

4. $\frac{72}{9} = 8$

$$72 = 72$$

Yes

Solve the (2-step) proportions. Show your work.

1. $\frac{y}{12} = \frac{3}{4}$

$4y = 36$

#1 answer $y = 9$

2. $\frac{-16}{m} = \frac{-8}{9}$

$-8m = -144$

#2 answer $m = 18$

3. $\frac{9}{27} = \frac{2}{x}$

$9x = 54$

#3 answer $x = 6$

4. 14 is to b as 28 is to 18

$\frac{14}{b} = \frac{28}{18}$

$28b = 252$

#4 answer $b = 9$

Solve the story problems using proportions.

Mr. Roy paid \$1.29 for 3 ponytail holders. He drove his truck to the store to get the ponytail holders. At this rate, what would eight ponytail holders cost?

Step 1: pick a letter (variable) and write down what it represents.

$x = \text{\$price of ponytail holders (8)}$

Step 2: Set-up a proportion

$\frac{x}{8} = \frac{1.29}{3}$

Step 3: Solve the proportion and answer the problem.

$3x = 10.32$

$x = \$3.44$

$\$3.44$ for 8 ponytail holders!

There are 2 robins for every 5 birds. How many robins are there for 80 birds?

Step 1: pick a letter (variable) and write down what it represents.

$x = \text{\# of robins for 80 birds}$

Step 2: Set-up a proportion

$\frac{x}{80} = \frac{2}{5}$

Step 3: Solve the proportion and answer the problem.

$5x = 160$

$x = 32$

32 robins for 80 birds