Algebra I Lesson 2.6 – Rates, Ratios, and Proportions Mrs. Snow, Instructor

Miles per hour, gallons per square foot, miles per gallon, teacher to student ratio, male to female ratio, win to loss. These relationships are **ratios** and are comparisons of two quantities that are divided. We can write **ratios** in a couple different ways: the ratio of a to b may be written as a: b or $\frac{a}{b}$ where $b \neq 0$.

Vocabulary

Equivalent – ratios that are equal $\left(\frac{a}{b} = \frac{c}{d}\right)$, more specifically,

Proportion – a statement that has to equivalent ratios, that is: $\frac{1}{2} = \frac{5}{10}$ **Rate** – a ratio where the quantities have two different units: $\frac{58 \ mi}{2 \ gal}$

Unit rate – a rate written as "stuff" per single amount. You can convert any rate to a unit rate: $\frac{58 \ mi}{2 \ gal} = \frac{29 \ mi}{1 \ gal}$

The ratio of games won to games lost for a baseball	
team is 3: 2. If the team lost 12 games, how many did	
they win?	
$\frac{\text{win}}{\text{loss}} \to \frac{3}{2}$	1. Write a ratio comparing sin to lost games
loss 2 3 x	2. Write a proportion. With x as the unknown number
$\frac{3}{2} = \frac{x}{12}$	of wins.
$6(12)\frac{3}{2} = \frac{x}{12}(12)$	3. Solve for x
18 = x	4. reduce before you multiply!!
ans: 18 wins	5. units!!!
Cory earned \$52.50 in 7 hours. Find the unit rate.	
(how much does he make per hour?)	1. Write proportion to find an equivalent ratio with a
$\frac{52.50}{7} = \frac{x}{1}$	denominator equal to 1.
7 1 7.5	2. Well, we already have solved for x, so divide the left
ans: \$7.50 dollars per hour	side of the equation!
	3. remember units!!!!

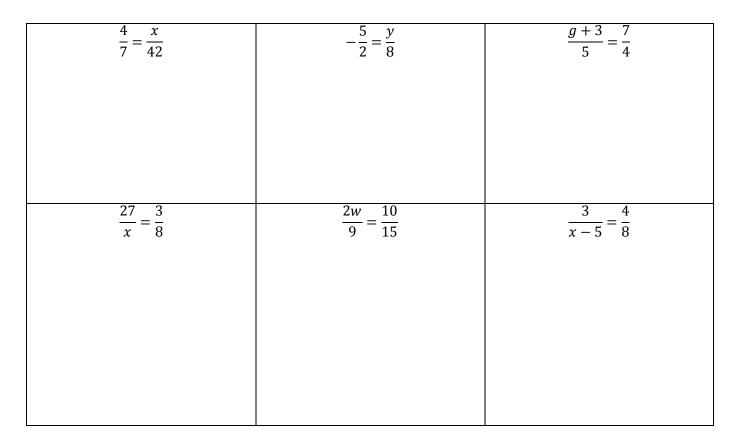
Another way we can solve proportions is to **cross multiply** or use the **Cross Product Property.** In a proportion, the cross products are equal.

$\frac{2}{3} = \frac{4}{6}$	1. Draw an X through your proportion; left side numerator down to right side denominator and right
(2)(6) = (4)(3)	side numerator down to left side denominator.
12 = 12	2. Set the products equal to each other

Solve:

The ratio of cat to dog adoptions at an animal rescue shelter is 3:4. If 18 cats are adopted during the month of December, how many dogs were adopted?

The Keith went on a bike ride, according to the map he had gone 56 miles. He had only been on the road for 4 hours. What was his speed in miles per hour? What is the speed in feet/second? Round to the nearest tenth.



A scale model of the human heart is 16 feet long. The scale is 32:1. How many inches long is the actual human heart?