Unit 2

Rate, Ratio and Proportional Reasoning

Ratios
Unit Rate
Proportions
Measurement Conversion
Percents

Unit 2 IXL Tracking Log

	Required Skills	
	Skill	**Your Score**
Week of 9/3	**R.1** (Write a Ratio)	
	R.4 (Identify Equivalent Ratios)	
	R.6 (Ratio Tables)	
	R.8 (Unit Rates)	
Week of 9/9	**R.12** (Do the ratios form a proportion?)	
	R.13 (Solve the Proportion)	
	T.3 (Convert and Compare Customary Units)	
	T.7 (Convert and Compare Metric Units)	
Week of 9/16	**S.5** (Percents of numbers and money amounts)	
	S.8 (Find what percent one number is of another)	
	S.10 (Find the total given a part and a percent)	

Unit 2: Rate, Ratio and Proportional Reasoning
Standards, Checklist and Concept Map

Georgia Standards of Excellence (GSE):

MGSE6.RP.1: Understand the concept of a ratio and use ratio language to describe a ratio between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote Candidate A received, Candidate C received nearly 3 votes."*

MGSE6.RP.2: Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is ¾ cup of flour for each cup of sugar."*

MGSE6.RP.3b: Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, at that rate, how many lawns could be mowed in 35 hours?*

MGSE6.RP.3 : Use ratio and rate reasoning to solve real-world mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

MGSE6.RP.3a : Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

MGSE6.RP.3c : Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

MGSE6.RP.3d : Use ratio and rate reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing.

What Will I Need to Learn??

_____ I can understand ratios
_____ I can understand unit rates
_____ I can solve unit rate problems
_____ I can make tables of equivalent ratios, find missing values, and plot points in a coordinate plane
_____ I can solve problems using proportions
_____ I can find percent of a number
_____ I can find the whole when given part and percent
_____ I can convert Metric units
_____ I can convert Customary units

Unit 2 Calendar: Math 6/7

9/2	9/3	9/4	9/5	9/6
Labor Day Holiday	Unit 2 Pretest Ratios	Ratios & Ratio Tables	Ratios & Ratio Tables	Quiz; Unit Rates
9/9	**9/10**	**9/11**	**9/12**	**9/13**
Rates & Proportions	Solving Proportions COMPUTER LAB	Solving Proportions	Measure -ment	Proportions & Quiz
9/16	**9/17**	**9/18**	**9/19**	**9/20**
Percent Problems	Percent Problems	Percent Problem Solving	Unit 2 Review	Unit 2 Test

Unit 2 - Vocabulary

Term	Definition
Cross Product	In a proportion, this is the result of multiplying the numerator of one ratio and the denominator of the other ratio
Customary System	The primary system of measurement used in the US, which uses a variety of conversions
Metric System	The system of measurement that uses a base-10 model; used by most countries
Percent	A number out of 100
Proportion	An equation of equivalent ratios
Rate	A ratio that compares quantities measured in different units
Ratio	A comparison of two numbers
Unit Rate	A comparison of two measurements in which one of the terms has a value of 1

Unit 2 – Vocabulary – <u>You Try</u>

Term	Definition	Illustration or Example
Cross Product		
Customary System		
Metric System		
Percent		
Proportion		
Rate		
Ratio		
Unit Rate		

Study Guide – Unit 2: Rates, Ratios & Proportional Reasoning

1. What is a ratio? _____
2. What is a rate? _____

   _____
3. What is a unit rate? _____

   _____
4. What is a percent? _____
5. Fill in the ratio table:

9	15			54
12		39	48	

6. 77 is 35% of what number? _____

7. Find 30% of 70. _____

8. Find the value of x. $\frac{15}{25} = \frac{x}{30}$ _____

9. Write the ratio as a unit rate: $145.98 for 9 tickets. _____

10. Ansley drove 520 miles in 8 hours. Taylor drove 210 miles in 3 hours.
    a. Who drove the fastest rate of speed? _____
    b. How do you know? _____

    _____

    _____

11. A circus elephant is going to stand on a ball. Lulu the Elephant weighs 2 Tons. The ball can hold up to 3,000 lbs.
    a. Can Lulu use this ball? Yes No
    b. Explain your answer. _____

    _____

    _____

12. The table shows the number of each item sold at the fair. What two items would the ratio 3:4 represent?

Item	Quantity Sold
Popcorn	64
Nachos	60
Hot Dog	28
Candy Bar	48

13. The ratio of boys to girls in a class is 4:8. If there are 24 students in the class, how many are boys?

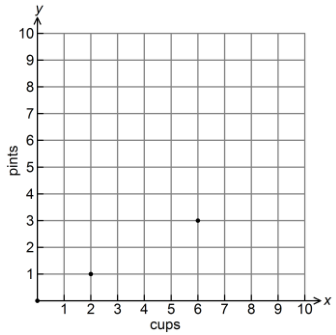
14. In a class of 25 students, 80% DID return their permission slips for the school field trip. How many students did NOT return their permission slips?

15. The table below shows the cost for varying number of books. If the rate stays the same, determine the value of *n*.

Number of Books	Cost
6	$81
10	$135
12	$162
15	n

16. PBIS Middle School held a car wash as a fundraiser. 15 trucks were washed. The other 40% of the vehicles were cars. How many total vehicles did they wash?

17. The graph below compares cups to pints. Which of the following ordered pairs would also satisfy this relationship?



A. (1, 2) B. (2, 4) C. (2, 0) D. (4, 2)

18. Drilon's paycheck last week was $146.50. He would like to put 6% of his earnings in his savings account. How much money should he put in his savings account?

a. $8.26 b. $8.79 c. $9.30 d. $16.03

19. The prices of 4 different bottles of lotion are given in the table. Which size bottle is the BEST value?

Size	Price
25 ounces	$4.50
20 ounces	$3.00
15 ounces	$1.80

A. The 25-oz bottle
B. The 20-oz bottle
C. The 15-oz bottle
D. They all have the same value

20. Driving at a constant speed, Daisy drove 260 miles in 6 hours. How far would she drive in 1 hour? 5 hours? 21 hours? Create a table.

21. Chompers is 76 cm long. How many mm is this?

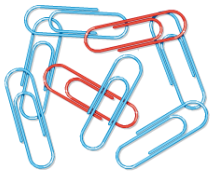
a. .76 mm b. 7.6 mm c. 760 mm 7,600 mm

Ratios

A _____ is a comparison of two quantities by division.

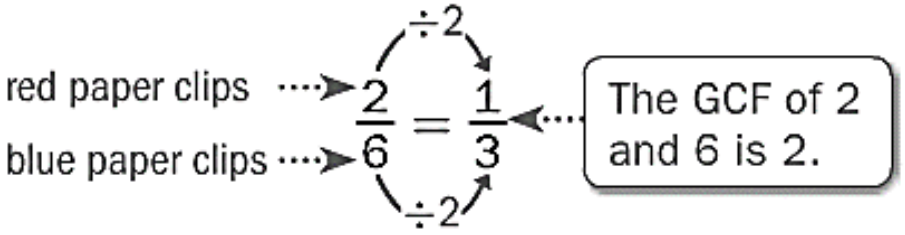
The ratio of two red paper clips to six blue paperclips can be written in the following ways:

2 to 6 **2:6** $\frac{2}{6}$



Just like fractions, we usually represent a ratio in simplest form.

ORDER MATTERS!



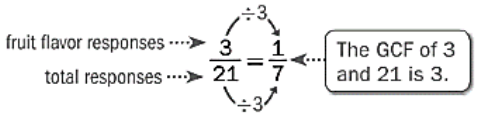
Example:

Several students named their favorite flavor of gum. Write the ratio that compares the number of students who chose fruit to the total number of students.

Favorite Flavors of Gum	
Flavor	***# of Responses***
Peppermint	9
Cinnamon	8
Fruit	3
Spearmint	1

Fruit: 3

Total: 9 + 8 + 3 + 1, or 21



The ratio is $\frac{1}{7}$, 1 to 7, or 1:7.

So, 1 out of every 7 students preferred fruit-flavored gum.

You Try:

Use the stars to answer questions 1 and 2.

1) Write the ratio of black stars to white stars in three different ways.

_____ _____ _____

2) Write the ratio of white stars to black stars in three different ways.

_____ _____ _____

Use the table below to answer questions 3-6.

Favorite Pets	
Snake	15
Dog	10
Cat	6
Hamster	8
Fish	1

3) What is the ratio of people who chose **snakes** as their favorite pet to those who chose **dogs**?

4) What is the ratio of people who chose **cats AND dogs** to those who chose **hamsters**?

5) What is the ratio of those who chose **snakes** as their favorite pet to **everyone** that was surveyed?

6) What is the ratio of those who chose **cats** to those who chose **fish**?

Use the words, ***"East Cobb Middle School"*** *to answer #s 7-11.*

7) What is the ratio of vowels to consonants?

8) What is the ratio of letters in ECMS to East Cobb Middle School?

9) What is the ratio of the letters in "East Cobb" to the letters in "Middle School"?

10) What is the ratio of the letters in "Middle School" to the letters in "East Cobb"?

11) Crain says the ratio of letters in "East" to "Cobb" is 4:4. Hailey says that ratio is 1:1. Who is correct? Explain your answer.

The table below shows the number of balloons purchased in each color at Party City. Using this information, answer questions 12-15.

Color	Red	Yellow	Blue	Green
Quantity Sold	10	20	15	25

12) Which two items does the ratio 10:20 represent?

13) Which two items does the ratio 3:5 represent?

14) Which two items does the ratio 5 to 3 represent?

15) Which two items does the ratio $\frac{3}{2}$ represent?

16) Which two items does the ratio 4:3 represent?

Different Types of Ratios

Part to _____ ratios are ratios that relate one part of a whole to another part of a whole.

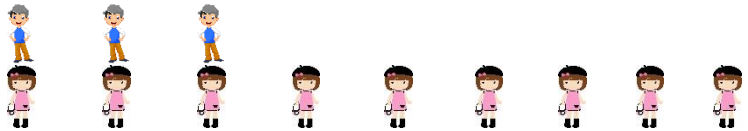
Example:

There are 4 boys for every 6 girls. The ratio of boys (a part of the group of kids) to girls (another part of the group of kids) is 4:6 *(simplified to 2:3)*.

You Try:

Boys:

Girls:



The ratio of boys to girls is: _____ to _____

The ratio of girls to boys is: _____ : _____

Part to _____ ratios are ratios that relate one part of the whole to the whole.

Example:

There are 4 boys (a part of the group of children) for every 10 children (the whole group of children), written as 4:10 *(simplified to 2:5)*. On the other hand, 6 girls for every 10 children is written as 6:10 *(simplified to 3:5)*.

You Try:

Boys:

Girls:

The ratio of boys to children is: _____ to _____

The ratio of girls to children is: _____ : _____

More Practice with Ratios

Use the table to answer the following questions.

Favorite Snacks of the 6th Graders	
Ice Cream	12
Takis	6
Candy	9
Fruit	4
Sunflower Seeds	2
Seaweed	5
Cookies	7

Find the following ratios. Don't forget to simplify if necessary.

1) candy to seaweed _____ to _____

2) sunflower seeds to cookies _____ to _____

3) Takis to ice cream _____ to _____

4) candy to cookies and fruit _____ to _____

5) cookies to Takis _____ to _____

6) fruit to candy _____ to _____

7) Takis and fruit to seaweed _____ to _____

8) ice cream to sunflower seeds _____ to _____

9) candy to total _____ to _____

10) cookies and ice cream to total _____ to _____

Ratio Tables

A _____ _____ is a table of values that displays equivalent ratios.

Example:

Soda	1	2	3
Juice	3	6	9

The ratios $\frac{1}{3}$, $\frac{2}{6}$, and $\frac{3}{9}$ are equivalent, since each simplifies to a ratio of $\frac{1}{3}$.

Equivalent ratios express the same relationship between quantities. In the example above, for every 1 soda, there are 3 juices.

Examples:

1) To make yellow icing, you mix 6 drops of yellow food coloring with 1 cup of white icing. How much yellow food coloring should you mix with 5 cups of white icing to get the same shade?

Use a ratio table. Since $1 \times 5 = 5$, multiply each quantity by 5.

So, add 30 drops of yellow food coloring to 5 cups of icing.

		×5	
Drops of Yellow	6	30	
Cups of Icing	1	5	
		×5	

2) In a recent year, Joey Chestnut won a hot dog eating contest by eating nearly 66 hot dogs in 12 minutes. If he ate at a constant rate, determine about how many hot dogs he ate every two minutes.

Divide each quantity by one or more common factors until you reach a quantity of 2 minutes.

So, Chestnut ate about 11 hot dogs every 2 minutes.

		÷2	÷3	
Hot Dogs	66	33	11	
Time (min)	12	6	2	
		÷2	÷3	

Practice with Ratio Tables

Find the missing values to complete the ratio tables.

1)

2		6	10
4	8		

2)

		3	
7	14	21	28

3)

8	16		48
5	10	25	30

4)

2	6	8	10
5			

5)

3	9	21	27
			36

6)

4		12	16
6	12		

7)

11		33	44
15	30		

8)

5		15	
12	24		48

9)

1	2	3	4
2			

10)

2	4	6	8
3			

11)

1		3	6
7	14		

12)

		3	
9	18	27	36

13)

10		30	40
15	30		

14)

3		9	
12	24		48

15)

8	16	24	32
			36

16)

15		45	60
16	32		

Unit Rates

A **rate** is a ratio comparing two quanities of different kinds of units. A **unit rate** has a denominator of 1 unit when the rate is written as a fraction. To write a rate as a unit rate, divide the numerator and the denominator of the rate by the denominator.

Ratio	Rate	Unit Rate
$15:5 = \frac{15 \text{ characters}}{5 \text{ seconds}} = \frac{3 \text{ characters}}{1 \text{ second}}$		

Examples:

Samantha picked 45 oranges in 5 minutes. Write this rate as a unit rate.

Write the rate as a fraction.
Compare the number of oranges to the number of minutes.
Then divide.

$$\frac{45 \text{ oranges}}{5 \text{ minutes}} \overset{\div 5}{=} \frac{9 \text{ oranges}}{1 \text{ minute}}$$

So, the unit rate is $\frac{9 \text{ oranges}}{1 \text{ minute}}$, or 9 oranges per minute.

The Australian dragonfly can travel 18 miles in 30 minutes. How far can the dragonfly travel in 1 minute?

Write the rate as a fraction.
Compare the distance to the number of minutes. Then divide.

$$\frac{18 \text{ miles}}{30 \text{ minutes}} \overset{\div 6}{=} \frac{3 \text{ miles}}{5 \text{ minutes}}$$

The ratio 3 to 5 cannot be simplified to a whole number rate. It can be written as $\frac{3 \text{ miles}}{5 \text{ minutes}}$ or as a unit rate of $\frac{3}{5}$ mile to 1 minute.

The dragonfly can travel $\frac{3}{5}$ mile every minute.

Unit Rates

	What is the rate?	Find the unit rate. Show your work!
 Jay drove 360 miles on 24 gallons of gas.		
 Maya drove 540 miles on 30 gallons of gas.	What is the rate?	Find the unit rate. Show your work!
 1452 calories in a 12-slice cake.	What is the rate?	Find the unit rate. Show your work!
 880 calories in an 8-slice pie	What is the rate?	Find the unit rate. Show your work!
 15-oz Cheerios for $3.95	What is the rate?	Find the unit rate. Show your work!
 10-oz Cheerios for $2.85	What is the rate?	Find the unit rate. Show your work!

Equivalent Ratios and Unit Rate

You can find a unit rate by setting up an equation of equivalent ratios. This equation is called a proportion.

Example:

1) There are 21 water bottles to 7 forks. Find the unit rate for 1 fork.

First, set up a proportion: $\frac{Water\ Bottles}{Forks} = \frac{21}{7} = \frac{\square}{1}$ (÷ 7 over 21/7, ÷ 7 under 21/7)

You can look at the relationship that is created for the forks. The 7 was divided by 7 to make 1. Then apply that same relationship to the numerator. 21 divided by 7 is 3.

So, there are 3 water bottles for every 1 fork.

21 water bottles:

7 forks:

You Try:

1) Megan paid $12.00 for 3 lip gloss flavors. What is the unit rate?

2) Erin paid $12.00 for 5 lip gloss flavors. What is the unit rate?

Equivalent Ratios

You can find equivalent ratios in two different ways, using a table or a graph.

Tables

1) Fill in the information already given to you.
2) Find the pattern by writing the numbers as a fraction.
3) Fill in the rest of the table based on the pattern. (Multiply the top and bottom number by a common factor.)

Example:

1) Find the missing value by finding equivalent ratios.

Green Beads	2	4	6	8	10
Blue Beads	5	10	15	20	?

(× 5 over 2 and 5; × 5 under 5 and ?)

$$\frac{2}{5} = \frac{4}{10} = \frac{6}{15} = \frac{9}{20} = \frac{10}{?}$$

Since the pattern shows that we are multiplying the numerator and denominator of our original fraction by the same factor, you can see that we multiplied 2 times 5 to get 10. That means we will multiply 5 by 5, so the ? must be equal to 25.

You Try:

1) Find the missing value by finding equivalent ratios.

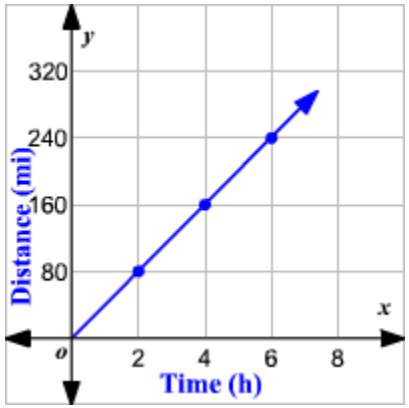
Green Beads	3	9	15	12	24
Blue Beads	5	15	25	20	?

$\frac{3}{5} = \frac{9}{15} = \frac{15}{25} = \frac{12}{20} = \frac{24}{?}$ $? =$ _____

Graphs:

1) Plot the points that are already given to you.
2) Draw a line to connect the points.
3) Plot the rest of the points based on the pattern you see.

Example: On a recent trip, Mr. Tripman noticed that every two hours, he drove 80 miles. Use the graph below to find out how far he would drive in 4 hours. What about 6 hours? 8 hours?



Ordered Pairs:

(2 , 80)

(4 , 160)

(6 , _____)

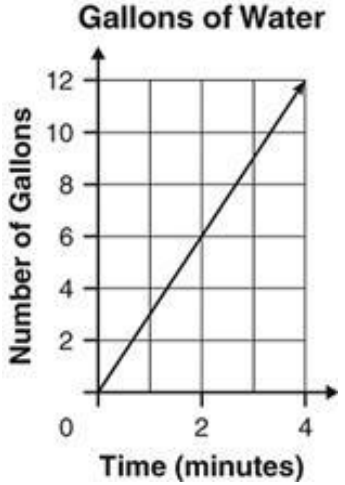
(8 , _____)

What pattern do you see?

Using the graph, state the unit rate in miles per hour:

You Try

1) Every 4 minutes, a garden hose puts out 12 gallons of water. Use the graph below to determine how much water is put out in 1 minute, 2 minutes, and 3 minutes.



Ordered Pairs:

(1 , _____)

(2 , _____)

(3 , _____)

(4 , 12)

What pattern do you see?

_____

_____

_____ gallons are used in 1 minute. (the unit rate)

_____ gallons are used in 2 minutes.

_____ gallons are used in 3 minutes.

2) Mr. Bailey doesn't want to use more than 60 gallons of water. What is the longest amount of time he can run the hose?

Proportions

A _____ is an equation that relates two equivalent ratios. Ratios are said to be proportional if they can both be simplified to the same amount.

$\frac{1}{2} = \frac{5}{10}$ This **is** a proportion.

$\frac{1}{2} = \frac{5}{8}$ This is **NOT** a proportion

You can check to see if two ratios are in proportion by cross-multiplying. The cross-products must be equal.

Proportion ✓ $\frac{6}{9} = \frac{8}{12}$ $72 \quad 72$

Proportion ✗ $\frac{5}{8} = \frac{7}{11}$ $55 \quad 56$

Example:

Determine whether the ratios are proportional. Circle = or ≠.

1) $\frac{6}{10}$ (=) ≠ $\frac{3}{5}$ The ratios are equal, so they are proportional.

You Try:

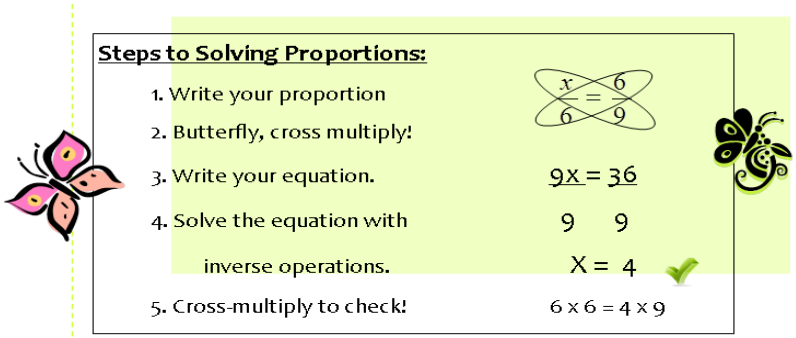
1) $\frac{4}{5} = \neq \frac{12}{15}$ 2) $\frac{8}{12} = \neq \frac{2}{3}$ 3) $\frac{7}{8} = \neq \frac{8}{9}$

4) $\frac{4}{5} = \neq \frac{7}{8}$ 5) $\frac{4}{12} = \neq \frac{5}{15}$ 6) $\frac{1}{3} = \neq \frac{1}{6}$

Solving Proportions

One way to solve proportions is to cross multiply and see what factor you need to make the cross-products equal.

Example:



Another way that you can solve a proportion is to find the factor that is shared across the numerator or denominator and use that same relationship to complete the proportion.

Example:

1) $\frac{4}{36} = \frac{u}{9}$ ÷4 $\frac{4}{36} = \frac{u}{9}$ ÷4 $u = 1$

2) $\frac{u}{36} = \frac{1}{9}$ ×4 $\frac{u}{36} = \frac{1}{9}$ ×4 $u = 4$

You Try:

Find the missing number in each proportion:

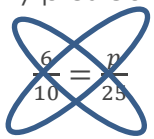
1) $\frac{r}{15} = \frac{4}{20}$ 2) $\frac{8}{10} = \frac{20}{y}$ 3) $\frac{x}{30} = \frac{3}{4}$

4) $\frac{2,5}{5} = \frac{j}{4}$ 5) $\frac{12}{a} = \frac{21}{7}$ 6) $\frac{k}{3} = \frac{14}{21}$

Proportions Word Problems

Example:

1) Talia won a pie-eating contest, eating 6 pies in 10 minutes. At that rate, how many pies can she eat in two hours?

$\frac{pies}{minutes}$ $\frac{6}{10} = \frac{p}{25}$  10p = 25(6)

10p = 150

p = 15

You Try:

1) Matthew hiked 10 miles in 4 hours. At that rate, how far can he hike in 18 hours?

2) A recipe calls for 2.5 cups of sugar to make 12 cookies. How much sugar is needed to make 300 cookies?

3) If 16 necklaces can be bought for $40, how much will 12 necklaces cost?

4) Ben can correctly solve 120 multiplication problems in 1 ½ minutes. At this rate, how long would it take him to solve 400 problems?

5) Emily types at a speed of 45 words 50 seconds. How many words can she type in 10 minutes?

6) Nora needs 1.5 cups of sugar to make 12 cupcakes. How much sugar does she need to make 44 cupcakes?

Finding the "Percent of" a Number

Percent means _____

In math ***"of"*** means _____

To find the "percent of" a number:

1) Change the percent to a _____ .
2) Then, _____ .

100% means 1 whole. Therefore 100% of 85 is 85. That's just like changing 100% to its equivalent decimal, 1, and multiplying by 85. If you have less than 100% of a number, the solution is less than the original number.

Example:

Find 75% of 36.

OPTION 1 (Change the percent to a decimal)	**OPTION 2** (Change the percent to a fraction)
.75 x 36 450 2250 27.00	$\frac{75}{100} \cdot \frac{36}{1} = \frac{3}{\cancel{4}_{1}} \cdot \frac{\cancel{36}^{9}}{1} = 27$
Therefore, 75% of 36 is 27.	

TIP: Always, always, always check your answer to see if it is reasonable. (Does it make sense?) 75% is less than 100% so 27 should be less than 36. 75% is greater than 50% so 27 should be greater than half of 36, which is 18. If those things are true, you are probably on the right track!

You Try:

For each problem below, circle the ONLY reasonable answer based on what you know.

Problem	Circle the ONLY reasonable answer			
90% of 40	9	36	17	57
25% of 72	18	54	2.5	70
50% of 1600	56	16	1650	800
110% of 55	1.5	115	60.5	25
5% of 80	58	4	804	85

Find the "percent of" each value given below.

1) 50% of 12

2) 20% of 45

3) 15% of 100

4) 5% of 40

5) 150% of 92

6) 25% of 90

7) 100% of 183

8) Eddie's mystery number is 45% of 200. What is his mystery number?

9) "Arachibutyrophobia" is the fear of peanut butter getting stuck to the roof of your mouth. In a survey of 150 people, 2% of them have arachibutyrophobia. How many people surveyed have this fear?

10) When making peanut butter and jelly sandwiches, 20% of people put the peanut butter on first. Out of 75 people, how many people would NOT put peanut butter on first?

11) At ECMS, about 25% of the 6th graders made an A in math. If there are 416 6th graders, how many made an A?

12) Last year, ECMS had 1280 students. If we have 110% of that amount this year, how many students are at ECMS this year?

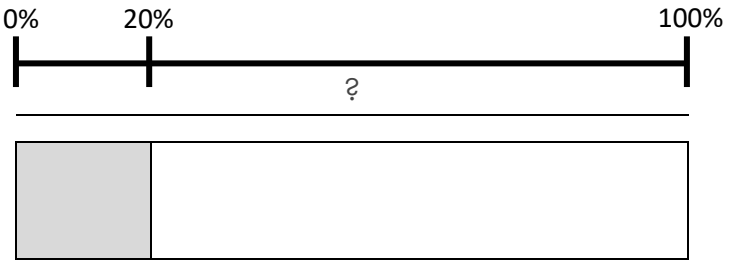
Finding the "Whole" when Given the Percent

Example:

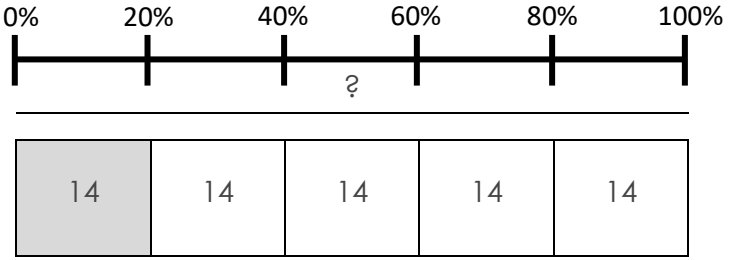
There are 14 candies in a bag that is 20% full. How many candies are in a full bag?

USE A TAPE DIAGRAM

Whole: Unknown (# of candies in full bag)
Part: 14 candies
Percent: 20%



If there are 14 candies in 20%, then there are 14 candies in each of the other 20% sections of the diagram. The total number of candies in the bag is the sum of all the quantities:
14 + 14 + 14 + 14 + 14 = 70 or 14(5) = 70.



Thus, there are 70 candies in a full bag.

USE A TABLE

There are 14 candies in a bag that is 20% full. How many candies are in a full bag?

Percentage	0%	20%	40%	60%	80%	100%
Part	0	14	28	42	56	70

You Try:

Use a table to solve the percent problems below.

1) 16 is 80% of what number?

Percentage		16	
Part	20%	80%	100%

2) Peyton made a 90% on her math test. If she got 27 questions correct, how many total questions were on the test?

Percentage			
Part			

3) 64% of the students in a classroom are girls. If there are 16 girls, how many total students are in the class?

Percentage			
Part			

The Percent Proportion

You can use a percent proportion to solve for any one piece when given the other 3.

$$\frac{\text{is}}{\text{of}} = \frac{\%}{100} \quad \text{or} \quad \frac{\text{part}}{\text{whole}} = \frac{\%}{100}$$

Example:

Finding a percent (part) of a number (whole):

What is 20% of 240?

First, set up your proportion:

$$\frac{x}{240} = \frac{20}{100}$$

Then solve by cross multiplying:

$$\frac{x}{240} = \frac{20}{100}$$

$$x \cdot 100 = 240 \cdot 20$$

$$x \cdot 100 = 4800$$

$$x = \frac{4800}{100}$$

$$x = 48$$

48 is 20% of 240.

Finding the whole given the percent (part):

60 is 75% of what number?

First, set up your proportion:

$$\frac{60}{x} = \frac{75}{100}$$

Then solve by cross multiplying:

$$\frac{60}{x} = \frac{75}{100}$$

$$60 \cdot 100 = x \cdot 75$$

$$6000 = x \cdot 75$$

$$x = \frac{6000}{75}$$

$$x = 80$$

60 is 75% of 80.

You Try:

Use one of the methods you have learned to solve the following problems.

1) What is 5% of 200?

2) 8 is 40% of what number?

3) What is 15% of 80?

4) 18 is 25% of what number?

5) What is 25% of 60?

6) 62 is 50% of what number?

Problem Solving with Percents

1) Martha put 20% of her paycheck in the bank. If her paycheck was $150, how much did she put in the bank?
   a) Should your answer be MORE or LESS than $150?
   b) Solution = _____
   c) Write your answer in a complete sentence:

   _____

   _____

2) Ethan got 90% of the problems correct on a quiz. If he got 27 problems correct, how many problems were on the quiz?
   a) Should your answer be MORE or LESS than 27?
   b) Solution = _____
   c) Write your answer in a complete sentence:

   _____

   _____

3) Whitney bought a pair of jeans that cost $25. If tax is 5%, how much tax will she pay?
   a) Should your answer be MORE or LESS than $25?
   b) Solution = _____
   c) Write your answer in a complete sentence:

   _____

   _____

4) Ellis' bill at Red Lobster was $18.50. If he gives his server a 20% tip, how much tip will he leave?
   a) Should your answer be MORE or LESS than $18.50?
   b) Solution = _____
   c) Write your answer in a complete sentence:

   _____

   _____

Tips, Taxes and Discounts

Tips: If my bill is $25, how much should I tip and what is my total?

EQ: What is 20% of $25?

Step 1: Find key words!

Step 2: Change all percents to decimals or fractions!

Step 3: Substitute key words in your question:

What is 20% of $25 means

y =.20 • 25 *OR* y = 1/5 • 25

Y (tip) = $5

Step 4: Add your tip to your total!

$25 + $5 tip= $30 total

BTW: You thank your server by giving him a *tip*! This tip will be...

Added Subtracted

... to your bill.

BTW: Anytime we buy something, we pay sales tax to the government. Thus, tax is...

Added Subtracted

... to your total.

Taxes: A shirt costs $25. If taxes are 5%, what will my total be?

EQ: What is 5% of $25?

Step 1: Find key words to tell you what to do!

Step 2: Change all percents into decimals or fractions!

Step 3: Substitute key words into your essential question:

Y = .05 • $25 *OR* y = 5/100 • 25

Y (tax) = $1.25

Step 4: Add your tax to your total!

$25 + $1.25 = $26.25

Discounts: If a $32 sweater is 25% off, what is the sale price?

EQ: What is 25% of $32?

Step 1: Find key words to tell you what to do!

Step 2: Change all percents into decimals or fractions!

Step 3: Substitute key words into your essential question:

Y = .25 • 32 *OR* Y = 25/100 • 32

Y (discount) = $8

Step 4: Subtract your discount from your original price!

$32 - $8= $24

BTW: When something is on sale, the discounted amount is...

Added Subtracted

... from the original price.

You Try: Problem Solving with Percents!

1) H&M has is having a 20% off sale on winter boots! If Hayden wants to buy a pair that originally costs $40, how much will she save? [Is 40 the PART or WHOLE?]	2) Vinny's family ordered pizza, and the bill was $21.85. They gave the delivery person a 20% tip. How much did they tip? [Is 21.85 the PART or WHOLE?]
3) At the museum's gift shop, Peyton bought a geode for $9.50. If tax was an additional 6%, how much did she pay in all?	4) The candy store has a 15%-off sale. If Kaitlyn is buying $8.49 in candy, how much will she save?
5) Mrs. Bothers gave a $9 tip at Waffle House. If the bill for dinner was $30, what percent did she tip?	6) Most people pay about 28% of their salary towards taxes. If Andy paid $14,000 in taxes, what was his total salary?
7) Tomeya got 92% of the problems right on a quiz. If there were 25 problems on the quiz, how many did she get right?	8) The 6th-grade teachers ate 90% of the candy from a bag of chocolate. If they ate 54 pieces, how many were in the FULL bag?

Converting Customary (Standard) Units of Measurement

Common Customary Measurements		
Length	**Weight**	**Capacity**
1 foot = 12 inch 1 yard = 36 inches 1 yard = 3 feet 1 mile = 5,280 feet 1 mile = 1,760 yards	1 pound = 16 ounces 1 ton = 2,000 pounds	1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 quart = 4 cups 1 gallon = 4 quarts 1 gallon = 16 cups 1 gallon = 128 fluid ounces

USING PROPORTIONS

66 in = _____ ft

$$\frac{12\ in}{1\ ft} = \frac{66\ in}{x\ ft}$$

$$12x = 66$$

So, 66 in. = 5.5 ft

$$x = 5.5$$

Remember: A proportion shows that two ratios are equivalent.
Use a conversion factor for one of the ratios.

You Try:

1) 6 tons = _____ lbs.

2) 21 ft = _____ yds.

3) _____ cups = 28 fl. oz.

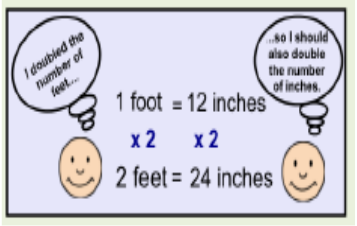
4) 3 mi = _____ ft.

5) 18 yds. = _____ in.

6) 6 pts = _____ gal

Always think about looking for patterns…

How many inches are in 2 feet?



Customary Conversions Practice

Length

1) 1 yard = _____ feet
2) 1 foot = _____ inches
3) 1 mile = _____ feet

Weight

1) 1 ton = _____ pounds
2) 1 pound = _____ oz.

Capacity

1) 1 pint = _____ cups
2) 1 gallon = _____ quarts
3) 1 quart = _____ pints
4) 1 cup = _____ fl. oz.
5) 1 gallon = _____ cups

1) 60 inches = _____ feet

2) 5 yards = _____ feet

3) 8 cups= _____ pints

4) 5 pounds = _____ oz.

5) 6 feet = _____ inches

6) 4 miles = _____ feet

7) 4 tons = _____ pounds

8) 3 quarts = _____ cups

9) 4 cups = _____ pints

10) 3 gallons = _____ qts.

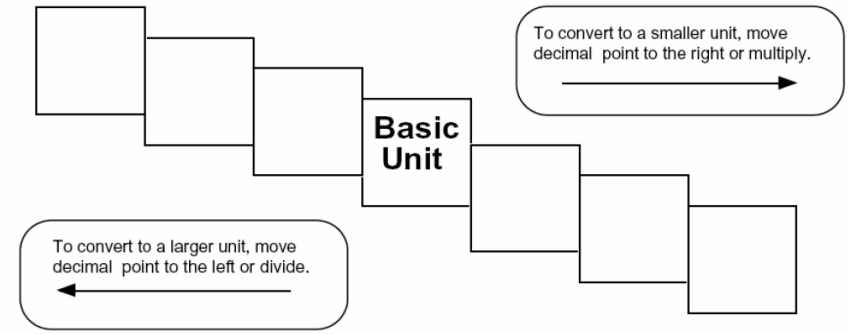
11) 8 cups = _____ quart

12) 31,680 ft = _____ miles

Metric Practice Units of Measurement

A _____ measures LENGTH.	A _____ measures WEIGHT.	A _____ measures LIQUID VOLUME.
		

Fill in each step with the appropriate unit.



This mnemonic device helps in remembering the units:

_____ _____ _____ _____ _____ _____ _____

Use a proportion to convert the following measurements.

1) A large thermos holds about 1.5 liters. How many milliliters does it hold? $\frac{1.5L}{\square mL} = \frac{1L}{1000mL}$ Answer: _____	2) A computer screen is about 30.75 cm wide. How many millimeters wide is it? $\frac{30.75cm}{\square mm} = \frac{1cm}{10mm}$ Answer: _____
3) A beetle weighs about .68 grams. How many milligrams does it weigh? *There are 1000 mg in one g* Answer: _____	4) The distance from Dallas to Denver is 1260 km. What is this distance in meters? *There are 1000 m in one km* Answer: _____
5) 50cm = _____ mm *There are 10 mm in one cm* Answer: _____	6) 3.16L = _____ mL *There are 1000 mL in one L* Answer: _____

Compare, Write <, > or =.

7) 500 mm ❑ 50cm *There are 10 mm in one cm*	8) 6.2 L ❑ 620 mL *There are 1000 mL in one L*
9) 8.3 kg ❑ 8300 g *There are 1000 g in one kg*	10) 2.6 m ❑ 26000 cm *There are 100 cm in one m*

Customary and Metric Conversions

1. 5000 g = _____kg (1 kg = 1000 g)

2. 64 oz = _____ lbs (16 oz = 1 lb)

3. 54 fl oz = _____ cups (1 cup = 8 fl oz)

4. 3 miles = _____ ft (1 mile = 5,280 ft)

5. A fence is 30 ft. How many yards long is the fence? (3 ft = 1 yd)

6. Griffin is making lemonade for his lacrosse team. He made 4.5 gal. How many cups of lemonade does he have? (1 gal = 16 cups)

7. Claire's dog weighs 25,700 grams. How many kilograms does the dog weigh? (1 kg = 1,000 g)

Converting between Customary & Metric Systems

1. 16 inches = _____ cm (1 in = 2.54 cm)

2. 5.2 gal = _____ L (1 L = 0.26 gal)

3. 54 fl oz = _____ cups (8 fl oz = 1 cup)

4) 3 lb = _____ kg (1 lb = 0.45 kg)

5) For each pair below, fill in >, <, or =.

a. 14 oz _____ 4 mg (3.5 oz = 1 mg)

b. 6 m _____ 18 ft (3.3 ft = 1 m)

c. 38 L _____ 5 gal (3.8 L = 1 gal)