Lesson 5-1: Understand Ratios

A _____ compares two quantities.

You can write RATIOS in 3 ways:

Write a ratio and then explain its meaning
{Simplest form - what does that mean?}

Monkeys to bananas

*The order of your ratio is important!

A sixth-grade basketball team has 3 centers,
5 forwards, and 6 guards.

5. Forwards to guards

6. Centers to total players

7. Guards to centers

A person's blood type is denoted with the letters A, B, and O along with the symbols + and −. The blood type A+ is read as *A positive*. The blood type B− is read as *B negative*.

9. O+ donors to A+ donors
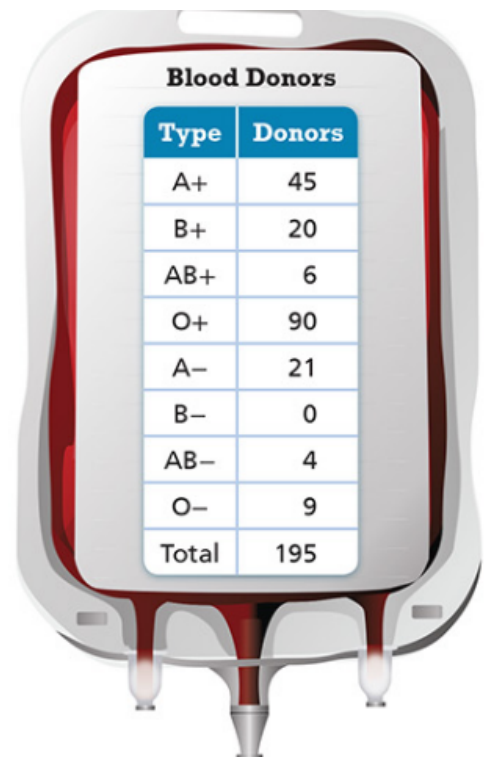
10. AB− donors to AB+ donors

11. B+ donors to total donors

12. O− donors to A− donors

13. A+ and B+ donors to AB+ donors

14. A− and B− donors to AB− donors

15. Which comparison does the ratio $\frac{90}{9}$ represent?

16. Which comparison does the ratio 20:21 represent?

Blood Donors

Type	Donors
A+	45
B+	20
AB+	6
O+	90
A−	21
B−	0
AB−	4
O−	9
Total	195

Lesson 5-2: Generate Equivalent Ratios

_____ _____ are ratios that express the same relationship.

We can use _____ or

_____ to generate equivalent ratios.

5. Complete the table using multiplication to find ratios that are equivalent to 4:5.

4			
5			

6. Complete the table using division to find ratios that are equivalent to 40:28.

		40
		28

7. $\frac{12}{21}$

8. 1:3

9. 6 to 8

10. Complete the table to find three ratios equivalent to 6 ft:2 yd.

Number of Feet		6		
Number of Yards		2		

Are they equivalent? 6:12 and 3:6   28:7 and 4:2

Lesson 5-3: Compare Ratios

You can find equivalent rates in 3 different ways:

- Compare the two _____ rates (denominator of 1)
- Compare as fractions with common _____
- Compare cross products (cross multiply) $\dfrac{a}{b} = \dfrac{c}{d}$

Example:
1. You saved $24 in 3 weeks and your sister saved $52 in 7 weeks

   Use unit rates to solve-how much did each save in 1 week.

2. Greg can complete 75 pushups in 3 minutes and Frank can complete 130 pushups in 5 minutes. Who performs push ups the fastest?

   .

EXAMPLE 1 **Compare Ratios**

Dustin had 3 hits for every 8 at bats.
Adrian had 4 hits for every 10 at bats.
Who has the better hits to at bats ratio?

Dustin		Adrian	
Hits	At Bats	Hits	At Bats
3	8	4	10

Use cross multiplication to solve. This always works!

Due to compatibility and size restrictions, only certain types of fish can live together in an aquarium. If there are 15 mollies in each tank with the ratios shown at the right, which tank has more fish?

Tank 1

Tank 2

4 Guppies : 5 Mollies

2 Angelfish : 3 Mollies
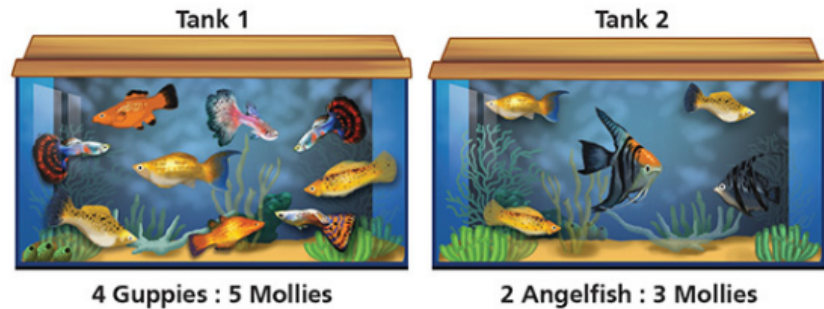
Sometimes you can use ratio tables to solve.

To make fruit punch, Darnell mixes 3 cups of pineapple juice with 4 cups of orange juice. Complete the ratio table. How much pineapple juice would Darnell mix with 20 cups of orange juice?

| Pineapple Juice (cups)	3				
Orange Juice (cups)	4	8	12		
Fruit Punch (cups)	7				

Ebony makes fruit punch using a ratio of 4 cups of pineapple juice to 5 cups of orange juice. Whose punch recipe uses more pineapple juice?

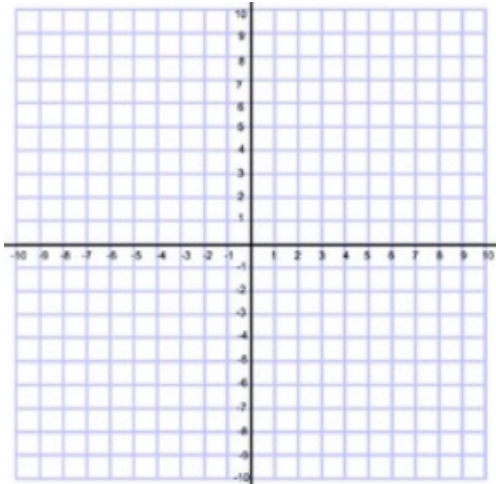| Pineapple Juice (cups)	4	8		
Orange Juice (cups)	5			
Fruit Punch (cups)	9			

Darnell and Ebony each use 12 cups of pineapple juice to make fruit punch. Who will make more punch? How much more?

Lesson 5-4: Represent and Graph Ratios

Coordinate Plane Review
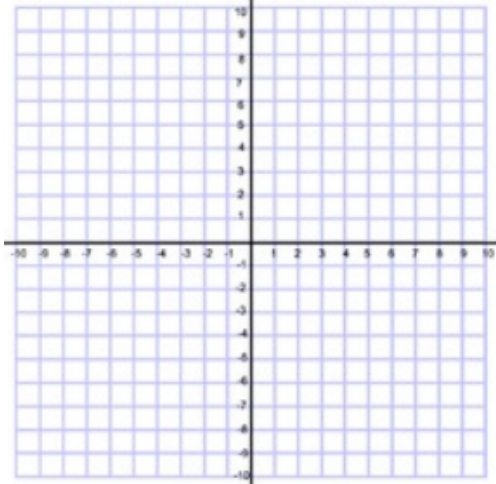
| Quadrant	x	y	(x,y)

Write the ordered pair:

A

B

C

D

E

Complete the table to show equivalent ratios representing a cost of $8 for every 3 boxes. Then write the pairs of values as points to be plotted on a coordinate plane.

Number of Boxes	Cost of Boxes ($)
3	8
6	16
9	24

Plot the equivalent ratios (3, 4), (6, 8), and (9, 12) on the graph. Use the graph to find the number of nonfiction books purchased if 10 fiction books are purchased.

Nonfiction Books Purchased (y-axis, 0 to 14)

Fiction Books Purchased (x-axis, 0 to 14)
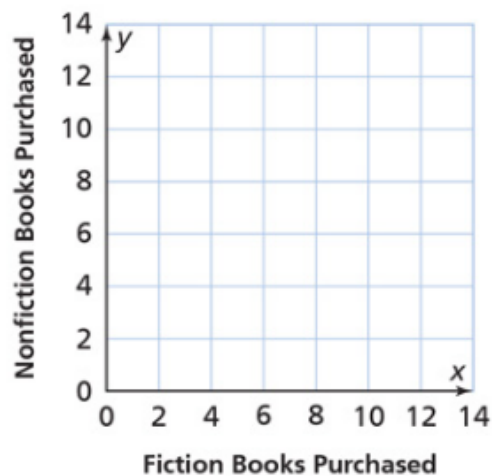
6.

2	3
4	6
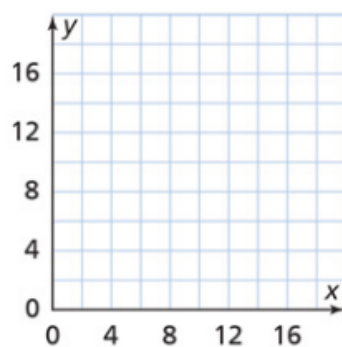
7.

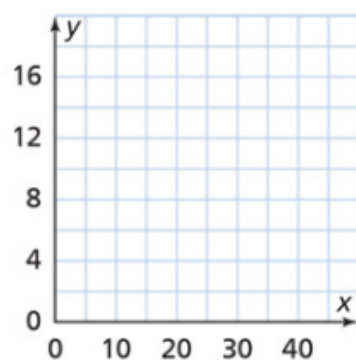| 5	2
25	10

x	1		3		
y	4	8		16	18

Lesson 5-5 Understand Rates and Unit Rates

- Rate: a _____ that compares two different _____.

- Unit Rate: the denominator is _____

- To write a unit rate- _____ the numerator and the denominator by the denominator

Examples:

1. I graded 45 tests in 3 hours. Write the rate and the unit rate.

2. Dennis read 12 books in 3 months. Write the rate and the unit rate.

3. Your heart beats 15 times in 10 seconds. What is the unit rate of beats per minute?

UNIT PRICE: You find the cost per 1 unit of something.

1. If it costs $6.00 for 12 cans of soda, what does 1 can of soda cost?

2. It costs $36 for 4 football tickets, what is the cost per ticket?

Find n

Miles	45	135
Hours	4	n

_____

Sasha packaged 108 eggs in 9 cartons. Write this statement as a rate.

Alejandro read 40 pages in 60 minutes. What is his unit rate in pages per minute?

_____

A bathroom shower streams 5 gallons of water in 2 minutes.

How many gallons of water does the shower stream in 6 minutes?

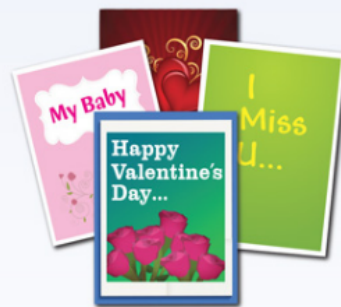How long can someone shower to use only 10 gallons of water?

_____

Ounces		24.6		123
Bags	1	2	5	

Lesson 5-6: Compare Unit Rates

1. Find the _____ _____ for each ratio you are given.

2. Compare the unit rates to answer the question.

Try It! Explain how to decide which is the better value, 4 greeting cards for $10 or 6 greeting cards for $14.

4 greeting cards for $10

6 greeting cards for $14

_____

Malia's car travels 600 feet in 20 seconds. Andre's motorcycle travels 300 feet in 12 seconds. Which is faster, the car or the motorcycle? Explain.

300 ft in 12 seconds

600 ft in 20 seconds
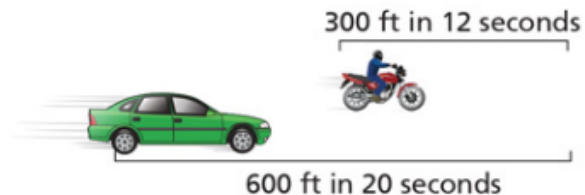
a. Find the unit rates.

b. Compare the unit rates.

Which is the better value, 2 books for $15 or
6 books for $45? Explain.

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12 laps in 8 minutes or 16 laps in 10 minutes

Lesson 5-7: Solve Unit Rate Problems

Remember-there are three ways to compare ratios

- Compare the two _____ rates (denominator of 1)
- Compare as fractions with _____ denominators
- Compare cross products (cross multiply)

$$\frac{a}{b} = \frac{c}{d}$$

When you solve ratio problems…

1. Write the _____ it gives you.
2. To find the missing information, pick the strategy that works best for you!

✅ **Try It!** Jarod paid $13.80 for 5 tickets to the game. At the same rate, how much would 3 tickets cost?

✅ **Try It!** A submarine travels 19 miles in $\frac{1}{2}$ hour. Write an equation to find out how long it would take the submarine to travel 57 miles at the same rate. Then find the time.

4. A football player runs 80 yards in 25 seconds. If he maintains the same rate of speed, how far could he run in 60 seconds?

5. a. On a family vacation, Amy's dad drove the car at a constant speed and traveled 585 miles in 13 hours. At this rate, how long would it have taken the family to travel 810 miles? What was the car's rate of speed?

b. Write an equation to find the total distance, d, that Amy's family traveled after t hours.

6. A house painter pays $506 for 22 gallons of exterior paint. The paint covers most of the outside of the house, but the painter needs 2 more gallons to finish the job. How much will the 2 gallons cost?

Lesson 5-8: Convert Customary Units

Customary Conversions			
Type of Measure	**Larger Unit**	**→**	**Smaller Unit**
Length	1 foot (ft)	=	12 inches (in.)
	1 yard (yd)	=	3 feet
	1 mile (mi)	=	5,280 feet
Weight	1 pound (lb)	=	16 ounces (oz)
	1 ton (T)	=	2,000 pounds
Capacity	1 cup (c)	=	8 fluid ounces (fl oz)
	1 pint (pt)	=	2 cups
	1 quart (qt)	=	2 pints
	1 gallon (gal)	=	4 quarts

To convert units, write the ratio you know.
The ratio you know comes from the _____ _____

8. 5 pt = [   ] c

9. $2\frac{1}{2}$ gal = [   ] qt

10. 2,640 yd = [   ] mi

11. Convert 16 yards to feet.
Use the conversion rate
3 feet = 1 yard.

12. Convert 10 pints to quarts.
Use the conversion rate
1 quart = 2 pints.

13. Convert 12 ounces to pounds.
Use the conversion rate
16 ounces = 1 pound.

A school custodian discovered a leak in a water
pipe. The custodian found that 1,920 fluid ounces
of water had leaked out. How many gallons
of water is this? Use the conversion
factor $\frac{1 \text{ gallon}}{128 \text{ fluid ounces}}$.

Lesson 5-9: Convert Metric Units

To convert units, place the unit you want to convert to on TOP of the ratio.

4 m = _____ cm   800 mL = _____ L

80 cm = _____ m   2.1 g = _____ mg

18. There are 10 millimeters in 1 centimeter. About how many millimeters long is this dinosaur bone? Explain.

About 22 cm