Name_____ Period _____

4.3- Notes- Ratios and unit rates(part I)

I CAN…

- **Identify unit rates.**
- **Compute unit rates.**
- **Compute unit rates involving complex fractions.**
- **Apply unit rates to real world applications**

Rate: A rate is a special ratio in which the two terms are in different units. For example, if a 12-ounce can of pop costs 99¢, the rate is 99¢ for 12 ounces.

Unit Rate: When rates are expressed as a **quantity of 1**, such as 2 feet per second (2 feet per 1 second) or 5 miles per hour. How many per 1 of something.

Give some examples of labels used in real life of unit rates used: (Hint: think of the word "per")

UNIT RATE… how to identify and compute

To write a rate as a unit rate, divide the numerator and the denominator of the rate by the denominator. "You want to find out how many of _____ there are **per 1** of something".

Rate → **Unit Rate**

$$\frac{60\ characters}{30\ seconds} \xrightarrow{\div 30} \frac{2\ characters}{1\ second}$$

OR, numerator divided by denominator.

Determine if the following are rates or unit rates. Circle all of the unit rates. If it's a rate then rewrite the rate as a unit rate.

$\frac{\$3.99}{1\ lb}$ $\frac{147.5\ miles}{2.5\ hours}$ $\frac{\$11.00}{4\ boxes}$

338 points in 16 games $3.94 for 1 pound 34 breaths in 4 hours

More Examples:

1) A certain horse requires 80 pounds of feed in 4 days. What is the unit rate?

2) Let's suppose another horse requires 175 pounds of food in 1 week. What is the horse's daily unit rate of food required?

You try: Write the unit rates without a calculator.

3) Christopher was able to type 223 words in 5 min. Find his typing speed in words per min.

4) Sara earned $100 in 8 hours. Find her rate of pay in dollars per hour.

5) A jet travelled 1875 miles in 5 hours. Find the following rates:

a) miles per hour b) miles per minute c) minutes per mile

Compute unit rates involving complex fractions.

Wouldn't it be great if most of real life happened with perfect numbers? We can estimate many things. **For example, if a trip to Chicago is 5 hours and 51 minutes. Rounding to 6 hours is not a big deal. But what if you are a marathon runner and you are competing in a race? Doesn't every second count?**

Let's suppose Brian can run a marathon (26.2 miles) in 2 hours and 30 minutes. (These are the steps you would show for an explain question).

STEP 1. What is his rate in **miles** per **hour**?

STEP 2. 26.2 miles per 2.5 hours gives us a complex fraction.

STEP 3. $\frac{miles}{hour} = \frac{26.2}{2.5}$ is the same as (remember our fractions!!) _____ . Let's use division from unit 1 to solve this rate.

When finding unit rates it is important to think of what is independent and dependent (think back to science class, you already have talked about this). Miles per hour is a comparison of the number of **miles** that can be travelled in one hour. Which of these, miles or hours is dependent on the other?

Let's suppose Brian's buddy Brent is going to race against him in the next marathon and he brags to Brian that he can run ½ a mile in just 3 minutes. Should Brian be worried that he will lose?

1. First Brian needs to convert Brent's rate to miles **per** hour. What fraction of an hour is 3 minutes?

2. What is the complex fraction we will use?

3. Find the unit rate: (This division problem is actually easier as fractions than the last one)

4. Should Brian be worried? Why or why not (explain the whole process you just used)?

Name _____ Period_____

4.3 part 1 HW

Determine if the following are rates or unit rates. Circle all of the unit rates. If it's a rate then rewrite the rate as a unit rate.

1. $\frac{120\ miles}{4\ hour}$

2. 180 feet in 19 seconds

3. $\frac{\$97.50}{15\ pizzas}$

4. $\frac{28.6\ miles}{1\ gallon}$

5. 75 points in 1 game

6. $19.49 for 6 pounds

Identify the label for the unit rate (with a word ratio) and find the unit rate for the given situations.

7. In 5 days, Southwest Airlines has at least 16,000 flights. What is an appropriate unit rate?

8. It takes approximately 20 hours to drive from Columbus to Houston which is about 1180 miles. What is the unit rate?

9. It costs $3.75 for a 15 oz jar of Yummy brand spaghetti sauce. What is the unit rate?

10. A 250 page book has approximately 75,000 total words. What is the unit rate?

11. Mr. Chittock wants to lose 30 pounds in 3 months for vacation. What is his unit rate per month? Per week? Is his goal reasonable?

12. Suppose it costs $1.50 for a half gallon of milk. What is the unit rate for a gallon of milk? A quart?

Write the following ratios in unit rate form and order them from least to greatest.

13. 7:2, 12 to 4, $\frac{20}{6}$, 21 to 14, 10:5

14. $\frac{12}{16}$, 7 to 10, 8:12, 9 to 15, $\frac{4}{18}$

Find the unit rate.

15. $\frac{72\ people}{3\ buses}$

16. $\frac{20\ ounces}{2.5\ servings}$

17. $\frac{288\ mi}{12\ gal}$

18. $\frac{10.4\ gal}{4\ min}$

19. $\frac{1125\ calaories}{4.5\ hours}$

20. $\frac{\$375}{15\ shares}$

21. A recipe that makes a dozen cookies calls for ¾ cup sugar. How much sugar is needed to make 4 ½ dozen cookies? *Show your word ratio, ratio, and final answer with labels, then explain.*