Name:_____   Date:_____

Notes

Algebra Section 1.3

Pages 15-20

Goals: "I will translate verbal phrases into expressions"

"I will find a unit rate given two quantities"

Vocabulary:

Rate: A fraction that compares two quantities measured in different units.

Unit Rate: The amount for one. The denominator is one. Use the word 'per'.

Writing Expressions

*REMEMBER THAT AN EXPRESSION consists of numbers and variables and does not have an equals sign.

Key Words

Addition	Subtraction
Sum Added to	**Difference Taken From Less Than**
Multiplication	**Division**
Product Times	**Quotient Divided by**

Try These:

a)   the **sum** of a number n and 5 $n+5$

b)   4 **less than** the quantity 6 times a number n $6n-4$

c)   3 **times** the **sum** of 7 and a number y $3(7 + y)$

d)   the difference of 22 and the square of a number m $22 - m^2$

e)   the quotient when the quantity 10 plus a number x is divided by 2 $\frac{10+x}{2}$

Write an expression to represent each situation.

a) A piece of ribbon l feet long is cut from a ribbon 8 feet long. Write an expression for the length, in feet, of the remaining piece. (Draw a picture to help)

8 ft	
l	?
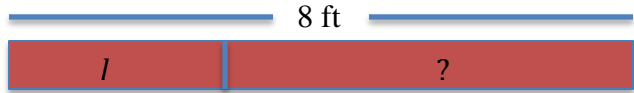
8 − l

b) You work with 5 other people at an ice cream stand. All the workers put their tips in a jar and share their tips equally at the end of the day. Write an expression to represent the total amount of money each worker will receive in tips at the end of the day. State what the variable stands for.

$\dfrac{t}{6}$

t= Total amount in tips

c) You and 4 friends meet to have dinner at a restaurant. Everyone decides to order the nightly special. Write an expression to represent the total cost of the meal. State what the variable stands for.

$5n$

n=The price of one nightly special

d) A service man charges $80 for a service call and $30 an hour. You want to pay off the charge in 6 months. Write an expression to show the amount owed each month. State what the variable stands for.

$\dfrac{80+30h}{6}$

h= The number of hours worked

Rates and Unit Rate

Example:

12 tops cost $10.80. Find the unit rate/price. (How much money per top?)

$$\frac{Cost}{top} = \frac{10.8 \quad \div 12}{12 \quad \div 12} = \frac{.9}{1}$$ **$0.90 <u>per</u> top**

a) A car travels 110 miles in 2 hours. Find the unit rate.

$$\frac{miles}{hours} = \frac{110}{2} = \frac{?}{1}$$ 55 miles per hour

b) You bought a gym membership and paid 3 months up front.   The cost was $120. Find the unit rate/price.

$$\frac{Cost}{Months} = \frac{120}{3} = \frac{40}{1}$$ $40 a month

c)   A 16-ounce box of cereal costs $2.99. Find the unit rate/price.

$$\frac{Cost}{Ounces} = \frac{2.99}{16} = \frac{.19}{1}$$ $0.19 per ounce

d)   9 gallons of gas costs $29.70. Find the unit rate/price.

$$\frac{Cost}{gallons} = \frac{29.70}{9} = \frac{3.3}{1}$$ $3.30 per gallon

e)   A jogger can run 4 miles in 38 minutes. Find the unit rate. (minutes <u>per</u> mile)

$$\frac{minutes}{miles} = \frac{38}{4} = \frac{9.5}{1}$$ 9.5 miles per minute

<u>Multi-Step Problems</u>

a) Your basic monthly charge for cell phone service is $30. This includes 300 free minutes. You pay a fee for each extra minute you use. One month you paid $3.75 for 15 extra minutes. Find your total bill if you use 22 extra minutes

 Step 1: CALCULATE THE UNIT RATE (cost per additional minute)

$3.75 \div 15 = 0.25$ $0.25 per each additional minute

Step 2: WRITE AN EXPRESSION (to represent the total cost per month)
$m=$ number of extra minutes

$30 + 0.25m$

Step 3: EVALUATE WHEN m = 22.

$$30 + 0.25 \cdot 22$$
$$30 + 5.5$$
$$35.5$$

The final cost is $35.50

b) You have a membership at a local ski club. The membership costs you $40 per month, which includes 10 lift tickets. You must pay a fee for each lift ticket after the tenth one. Two months ago you paid $13.50 for 3 extra lift tickets.

Step 1: Calculate the unit rate

$$13.5 \div 3 = 4.5$$

      $4.50 per lift ticket

Step 2: Write an expression to represent the total cost for any number of extra lift tickets (t).

$$40 + 4.5t$$

Step 3: Find your total cost for this month if you bought 7 extra lift tickets. $t=7$

$$40 + 4.5 \cdot 7$$
$$40 + 31.5$$
$$71.5$$

The total cost for this month is $71.50