

Name: Key

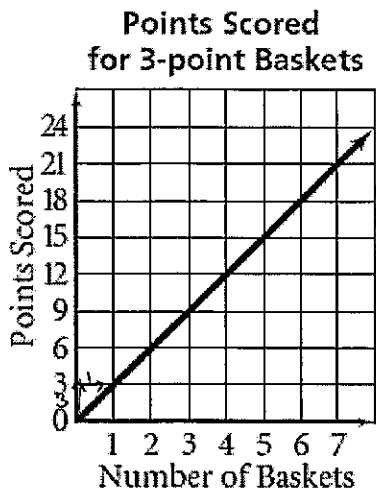
Class: _____

M8-U4: Notes #8 - Word Problems

Date: _____

Warm-up:

Find the rate of change. Explain what the rate of change means for the situation.



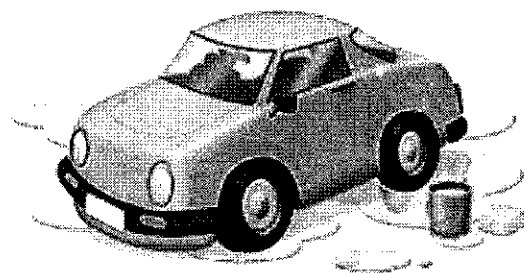
$$\frac{\Delta y}{\Delta x} = \frac{3}{1} = 3$$

as the # of baskets increase
the pts increase by 3.

Equations for Linear Relationships

Cars and trucks are an important part of American life and culture. There are nearly 200 million licensed drivers and 140 million registered passenger cars in the United States. To help people keep their cars clean, many cities have self-service car washes.

At most self-service car washes, the charge for washing a car and the company's profit depend on the time the customer spends using the car wash. To run such a business efficiently, it helps to have equations relating these key variables.



Getting Ready – Vocabulary:

Rate of change a comparison between two quantities that are changing; this is slope.

Initial Value is like the y-intercept, it's the value for doing nothing; ex. flat fee.

Try It!

- Sudzo Wash and Wax charges customers \$0.75 per minute to wash a car. Write an equation that relates the total charge c to the amount of time t in minutes.

$$C = .75t$$

rate of change hint
 "per something"
 ↳ the independent variable.

- Pat's Power Wash charges \$2.00 per car to cover the cost of cleaning supplies, plus \$0.49 per minute for the use of water sprayers and vacuums. Write an equation for the total charge c for any car-wash time t .

$$C = .49t + 2$$

Equations for Linear Relationships

1. The Squeaky Clean Car Wash charges by the minute. This table shows the charges for several different times.

Squeaky Clean Car Wash Charges

0	Time (min)	5	10	15	20	25
3	Charge	\$8	\$13	\$18	\$23	\$28

- a. Explain how you know the relationship is linear.

constant rate of change

- b. What are the slope and y-intercept of the line that represents the data?

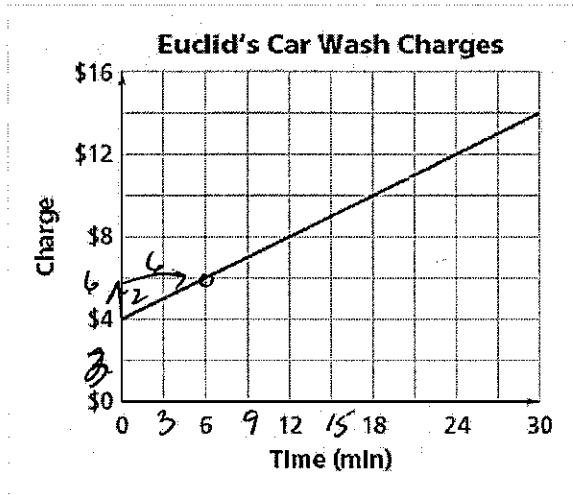
$$m = \frac{5}{5} = 1 \quad \text{\$/ per minute plus 3 additional dollars}$$

$$b = (0, 3)$$

- c. Write an equation relating charge c to time t in minutes.

$$C = t + 3$$

2. Euclid's Car Wash displays its charges as a graph. Write an equation for the charge plan at Euclid's. Describe what the variables and numbers in your equation tell you about the situation.



$$m = \frac{2}{6} = \frac{1}{3}$$

$$b = (0, 4)$$

Watch out for scale changes.

Equation: $C = \frac{1}{3}t + 4$

Describe: Slope is \$.33 per minute plus a \$4 initial charge. or for every 3 minutes it goes up \$1.

3. Use the function in the table at the right.
a. Identify the dependent and independent variables.

gallons of water loads of laundry

- b. Write a rule to describe the function.

let: $l = \text{loads}$
 $g = \text{gallons}$ $g = 34l$

1 load	34 gallons
2 loads	68 gallons
3 loads	102 gallons
4 loads	136 gallons

- c. How many gallons of water would you use for 7 loads of laundry?

$$g = 34(7)$$

$$g = 238 \text{ gallons}$$

- d. In one month, you used 442 gallons of water for laundry. How many loads did you wash?

$$\frac{442}{34} = \frac{34l}{34}$$

$$13 \text{ loads} = l$$

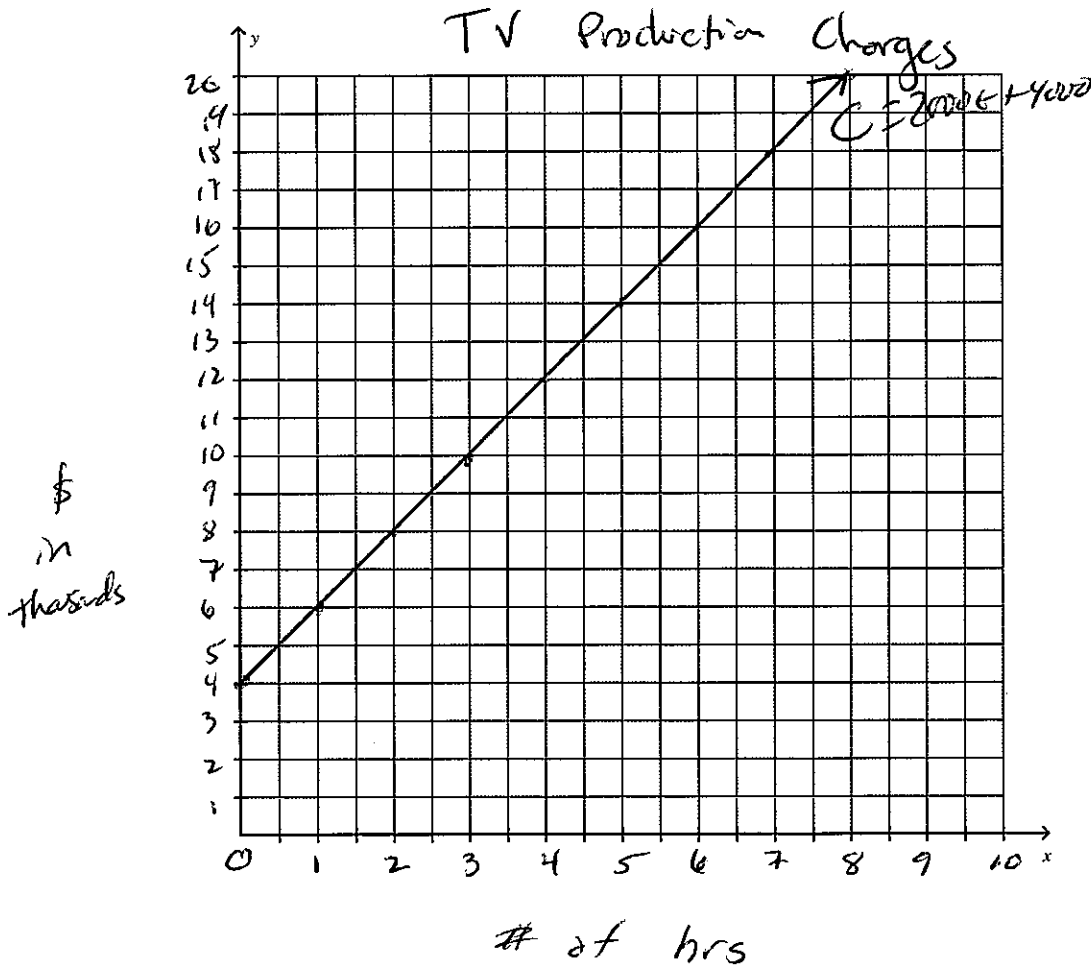
4. A television production company charges a basic fee of \$4000 and then \$2000 per hour when filming a commercial.

a. Write an equation in slope-intercept form relating the basic fee and per-hour charge.

let $t = \text{time}$
 $c = \text{charge}$

$$C = 2000t + 4000$$

b. Graph your equation.



c. Use your graph to find the production costs if 4 hours of filming were needed.

\$12,000