

Key

Math 1

Unit 2 Review

Name KEY Date \_\_\_\_\_

1. The table below give the number of cats in a household and the number of times the house gets vacuumed per month.

- a. Fill in the top row of the table with the independent variable and the bottom with the dependent variable.

# of cats in a household ( $n$ )	0	1	3	7	10	20	25	32	100
# of times the house gets vacuumed ( $V$ )	2	6	10	26	30	56	74	82	210

- b. Find the linear regression equation for this data set. Write your answer in function notation.

$$V(n) = 2.063n + 9.721$$

- c. Explain the meaning of your equation's slope in the context of this data set.

You vacuum 2.063 times per month for every 1 cat in the house

- d. Explain the meaning of your equation's y-intercept in the context of this data set.

If you have 0 cats you will vacuum 9.721 times per month.

- e. Find and interpret the correlation coefficient.

$r = 0.994$  There is a strong, positive association between the number of cats you have and how many times you vacuum per month.

- f. Find out how many times this house would get vacuumed if they had 46 cats.

$$V(46) = 2.063(46) + 9.721 = 104.619$$

- g. If the house was vacuumed 78 times last month, how many cats were living there?

$$78 = 2.063n + 9.721$$

$$- 9.721 \quad - 9.721$$

$$68.279 = 2.063n$$

$$\frac{68.279}{2.063} = \frac{2.063n}{2.063}$$

$$n = 33.097 \text{ cats}$$

- h. What is the practical domain for this situation? What is the practical range?

Domain:  $\{0, 1, 2, \dots\}$  Range: Whole #s  $\geq 2$

- i. Use the points (1, 6) and (7, 26) to create an equation in slope-intercept form.

Slope:  $\frac{26-6}{7-1} = \frac{20}{6} = \frac{10}{3} \approx 3.33$

$$y = 3.33x + b$$

$$6 = 3.33(1) + b$$

$$-3.33 \quad -3.33$$

$$b = 2.67$$

$$y = 3.33x + 2.67$$

- j. Use the points from Part h to create an equation in point-slope form.

$$y - 6 = 3.33(x - 1) \text{ or } y - 26 = 3.33(x - 7)$$

- k. Would you rather use your equation from Part b or Part i to make predictions about this data set? Explain your choice.

Part b is more accurate we used every point in our data to calculate it instead of just two.

Arithmetic Sequences Explicit Equation:  $a_n = a_1 + (n-1)d$

$$d = -3.4$$

2. Find the next three terms in the sequence below:

$$\{7.2, 3.8, 0.4, \underline{-3}, \underline{-6.4}, \underline{-9.8}\}$$

3. Find the 93<sup>rd</sup> term for the following sequence:  $\{-48, -39.5, -31, \dots\}$   $d = 8.5$

1.) Need explicit formula

$$a_n = -48 + (n-1)8.5$$

$$2.) \text{ solve: } a_{93} = -48 + (93-1)8.5$$

$$a_{93} = 734$$

4. What term of the sequence  $\{15, -8, -31, \dots\}$  is -790?

$$1.) \text{ Explicit: } a_n = 15 + (n-1)(-23)$$

$$2.) \text{ solve for } n: \begin{array}{rcl} -790 & = & 15 + (n-1)(-23) \\ -15 & -15 & \end{array}$$

$$\begin{array}{rcl} -805 & = & (n-1)(-23) \\ -23 & & -23 \end{array}$$

$$35 = n-1$$

5. Find the missing terms in the arithmetic sequence below:

$$\{864, \underline{920}, \underline{976}, \underline{1032}, 1088, \dots\}$$

$$1.) \text{ Explicit: } 1088 = 864 + (5-1)d$$

$$2.) \text{ Solve for } d: 224 = 4d$$

$$56 = d$$

6. Write the explicit and recursive equations for the following sequences:

a.  $\{12, 4, -4, \dots\}$

$$d = -8$$

$$a_n = 12 + (n-1)(-8)$$

Recursive

$$\begin{cases} a_1 = 12 \\ a_n = a_{n-1} - 8 \end{cases}$$

b.  $\{71, 82.5, \underline{94}, \dots\}$

$$d = 11.5$$

$$a_n = 71 + (n-1)(11.5)$$

$$\begin{cases} a_1 = 71 \\ a_n = a_{n-1} + 11.5 \end{cases}$$

7. Imagine Mr. Shirey gets a job at UPS for the holiday season as a package runner. He gets paid \$20 per day, plus \$1.25 for each package he delivers.

a. What is the independent variable? What is the dependent variable?

I: # of packages he delivers

D: Daily Pay

b. What are the practical domain and range for this situation?

D:  $\{0, 1, 2, 3, \dots\}$  or whole #s  
 R:  $\{20, 21.25, 22.50, 23.75, \dots\}$  or  $\geq 20$

c. Write a recursive equation for this situation.

$$\begin{cases} a_0 = 20 \\ a_n = a_{n-1} + 1.25 \end{cases}$$

d. Using  $D$  for their daily pay and  $p$  for the number of packages delivered, write an explicit equation in function notation that represents the situation above.

$$D(p) = 1.25p + 20$$

e. Explain the meaning of the slope and y-intercept as they pertain to this situation.

$1.25 \rightarrow$  Daily Pay  
 $1 \rightarrow$  # of packages  
 Mr. Shirey's daily pay increases by \$1.25 for every 1 package he delivers.

f. How many deliveries did Mr. Shirey make if he got paid \$63.75 on one day?

$$\begin{array}{rcl} 63.75 & = & 1.25p + 20 \\ -20 & & -20 \end{array}$$

$$43.75 = 1.25p$$

$$p = 35 \text{ packages}$$

g. How much money did Mr. Shirey make on a day where he made 72 deliveries?

$$D(72) = 1.25(72) + 20$$

$$D(72) = \$110$$

h. Mr. Shirey made \$150 in a two-day period. How many packages did he deliver during that time?

$$150 = 1.25p + 40$$

$$110 = 1.25p$$

$$88 = p$$

packages

↑  
 (Two days worth)

