

Name: Answer key Per: \_\_\_\_\_ Date: \_\_\_\_\_  
 Serafino • Algebra 2E

## 2-RE Unit 2 – Recap & Exploration

### 2 Part 2: Writing Equations of Functions

#### Part 1: Graphing Functions

#### Part 2: Writing Equations of Functions

- Writing equations of lines  
 Given point(s) and/or slope  Converting from one form to another  Given a situation
- Write equations of absolute value  
 Given a vertex and point  Given a graph
- Write equations of piecewise functions  
 Given a situation  Given a graph
- Write equations of any function given transformations

#### Part 3: Regressions

#### Part 4: Analyzing Functions

1. WRITING LINEAR FUNCTIONS FROM INFO: Fill out the chart below. Do all work on separate paper.

Information	Point–Slope Form	Slope–Intercept Form	Standard Form
Slope: $\frac{3}{4}$ y-int: (0, 2)	$y - 2 = \frac{3}{4}x$	$y = \frac{3}{4}x + 2$	$3x - 4y = -8$
(4, -3) (-5, 1)	$y - 1 = \frac{-4}{9}(x + 5)$ $y + 3 = \frac{-4}{9}(x - 4)$	$y = \frac{-4}{9}x - \frac{11}{9}$	$4x + 9y = -11$
	$y + 2 = \frac{3}{2}(x - 4)$	$y = \frac{3}{2}x - 8$	$3x - 2y = 16$
	$y = \frac{1}{3}(x - 6)$	$y = \frac{1}{3}x - 2$	$2x - 6y = 12$
	$y = 2(x + 3)$	$y = 2x + 6$	$2x - y = -6$
Slope: 0 Point: (3, 5)	$y = 5$	$y = 5$	$y = 5$
Points: (3, 7) (3, -2)	$x = 3$	$x = 3$	$x = 3$
Slope: -2 x-int: (4, 0)	$y = -2(x - 4)$	$y = -2x + 8$	$2x + y = 8$

## 2. WRITING LINEAR FUNCTIONS FROM A SITUATION: Remember to define your variables!!

### Slope Intercept Form:

- a. You buy a cactus when it is 4 inches tall and it grows 1 in per year. Write a function that models the height of your cactus per year.

$h = \text{height (in)}$   
 $t = \text{time in years}$

$$h = t + 4$$

- b. Tony weighs 185 lbs and wants to lose 3 lbs every 2 weeks. Write a function that models how much Tony will weigh during the weeks of his diet.

$w = \text{weight (lbs)}$   
 $t = \text{time in weeks}$

$$w = -\frac{3}{2}t + 185$$

- c. I open a bank account with \$2000 in and put in \$300 every 6 months. Write a function that models how much money you'll have each year.

$m = \text{money in dollars}$   
 $t = \text{time (years)}$

$$m = 2000 + 600t$$

### Point-Slope Form:

- d. When my cat was 9, she weighed 10 lbs. She is now 12 and weighs 12 lbs.  $(9, 10)$   $(12, 12)$   $m = \frac{2}{3}$

$w = \text{weight (lbs)}$   
 $a = \text{age of cat}$

$$w = \frac{2}{3}(a - 9) + 10$$

$$w = \frac{2}{3}(a - 12) + 12$$

- e. The temperature has been decreasing about 2 degrees every week and there is a prediction that in 5 weeks, it's going to be 51°

$t = \text{temperature}$   
 $w = \text{time in weeks}$   
from now

$$t - 51 = -2(w - 5) \quad \text{or} \quad t = -2(w - 5) + 51 \quad (5, 51)$$

- f. Three weeks ago, I had 20 markers. I go through about 2 markers per week.  $(-3, 20)$

$m = \text{markers}$   
 $t = \text{time in weeks}$   
since now

$$m - 20 = -2(t + 3) \quad \text{or} \quad m = -2(t + 3) + 20$$

### Standard Form:

- g. Your wallet contains \$100, but only in \$10 and \$5 bills. Write a function that models how many of each bill you could have in your wallet.

$f = \# \$5 \text{ bills}$   
 $t = \# \$10 \text{ bills}$

$$10t + 5f = 100$$

- h. You have to seat 150 guests at tables that can either fit 10 or 12 people. Write a function that models how many of each table you need.

$t = \# 10\text{-seat tables}$   
 $v = \# 12\text{-seat tables}$

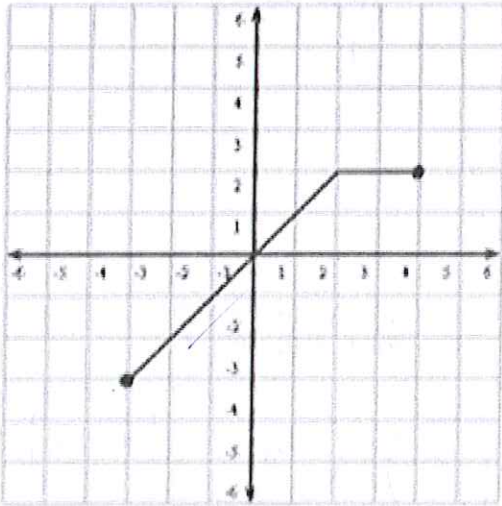
$$10t + 12v = 150$$

- i. The Maroons scored 38 points by only scoring Touchdowns (6 points) and Two-Point conversions. What function models how many of each they could have?

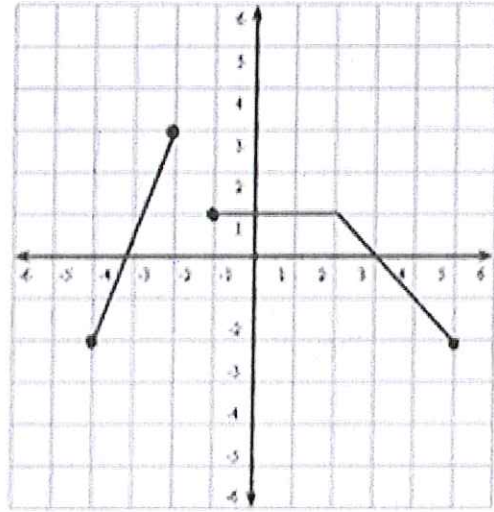
$d = \# \text{ touchdowns}$   
 $c = \# 2\text{-pt conversions}$

$$6d + 2c = 38$$

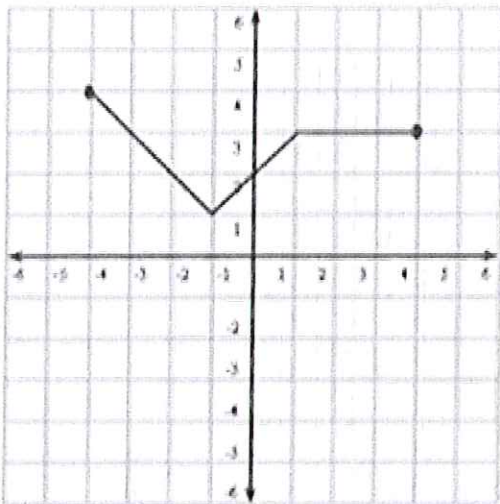
$$c. \quad f(x) = \begin{cases} x, & -3 \leq x \leq 2 \\ 2, & 2 \leq x \leq 4 \end{cases}$$



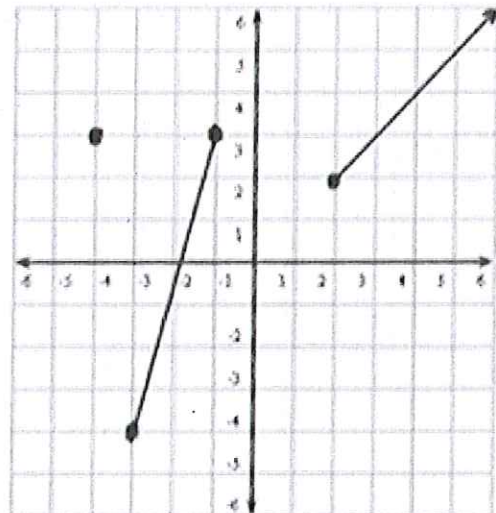
$$d. \quad f(x) = \begin{cases} \frac{5}{2}(x+4)-2, & -4 \leq x \leq -2 \\ 1, & -1 \leq x \leq 2 \\ -x+3, & 2 \leq x \leq 4 \end{cases}$$



$$e. \quad f(x) = \begin{cases} -x, & -4 \leq x \leq -1 \\ x+2, & -1 \leq x \leq 1 \\ 3, & 1 \leq x \leq 4 \end{cases}$$



$$f. \quad f(x) = \begin{cases} 3 & x = -4 \\ \frac{7}{2}(x+1)+3 & -3 \leq x \leq -1 \\ x, & x \geq 2 \end{cases}$$



or  $f(x) = \begin{cases} |x+1|+1 & -4 \leq x \leq 1 \\ 3, & 1 \leq x \leq 4 \end{cases}$

## 3. ABSOLUTE VALUE FUNCTIONS

a) Vertex:  $(-3, -2)$   
Point:  $(6, 4)$

$$a = \frac{6}{9} = \frac{2}{3}$$

$$y = \frac{2}{3}|x+3|-2$$

b) Vertex:  $(0, -5)$   
Point:  $(6, -3)$

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

$$y = \frac{1}{3}|x|-5$$

c) Vertex:  $(7, 0)$   
Point:  $(8, 8)$

$$\frac{8}{1}$$

$$y = 8|x-7|$$

a) Vertex:  $(5, -12)$   
Point:  $(-1, -10)$

$$\frac{+2}{-6}$$

$$y = \frac{1}{3}|x-5|-12$$

b) Vertex:  $(-3, 5)$   
Point:  $(0, 0)$

$$\frac{-5}{3}$$

$$y = \frac{-5}{3}|x+3|+5$$

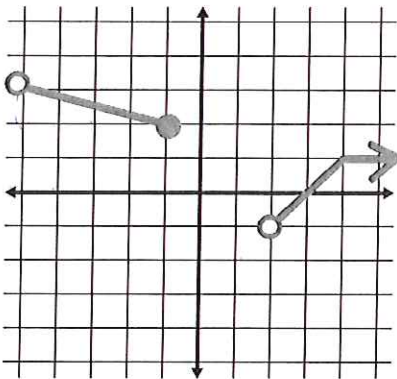
c) Vertex:  $(5, 5)$   
Point:  $(-9, -9)$

$$y = -|x-5|+5$$

## 4. PIECEWISE FUNCTIONS: Write the equations of the piecewise functions

a)

$$f(x) = \begin{cases} -\frac{1}{4}x + \frac{7}{4}, & -5 < x \leq -1 \\ x - 3, & -2 < x \leq 4 \\ 1, & x \geq 4 \end{cases}$$



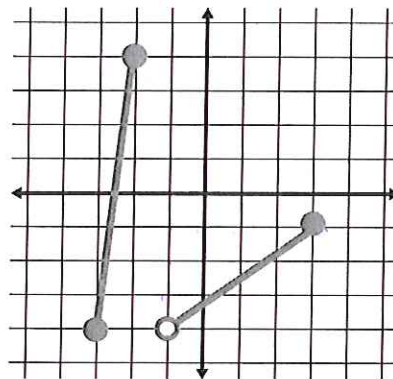
$$m = -\frac{1}{4} \quad (-1, 2)$$

$$2 = -\frac{1}{4}(-1) + b$$

$$2 = \frac{1}{4} + b$$

b)

$$f(x) = \begin{cases} 8x + 20, & -3 \leq x \leq -2 \\ \frac{3}{4}x - \frac{13}{4}, & -1 < x \leq 3 \end{cases}$$



$$m = 8 \quad (-2, 4)$$

$$4 = -2(8) + b$$

$$4 = -16 + b$$

$$20 = b$$

$$m = \frac{3}{4} \quad (3, -1)$$

$$-1 = \frac{3}{4}(3) + b$$

$$-1 = \frac{9}{4} + b$$

$$-\frac{4}{4} - \frac{9}{4} =$$

## 5. WRITING FUNCTION TRANSFORMATIONS

(Calculators ok to check math)

$g(x) =$	Name all Transformations	$f(x) = 3x + 5$	$f(x) = \frac{1}{2} x - 5  - 7$	$f(x) = -3 x + 6 $	$f(x) = 3(x - 2) + 1$
$2f(x)$	① Vertical stretch	$g(x) = 6x + 10$	$g(x) =  x - 5  - 14$	$g(x) = -6 x + 6 $	$g(x) = 6(x - 2) + 2$
$3f(x + 2)$	① Vert. stretch ② shift left 2	$g(x) = 9x + 33$	$g(x) = \frac{3}{2} x - 3  - 21$	$g(x) = -9 x + 8 $	$g(x) = 9x + 3$
$-f(x) + 7$	① Reflect over x-axis ② Shift up 7	$g(x) = -3x + 2$	$g(x) = -\frac{1}{2} x - 5  + 14$	$g(x) = 3 x + 6  + 7$	$g(x) = -3(x - 2) + 6$
$\frac{3}{4}f(x - 6) + 1$	① Vertical compression ② Shift right 6 ③ Shift up 1	$g(x) = \frac{9}{4}x - \frac{35}{4}$	$g(x) = \frac{3}{8} x - 11  - \frac{17}{4}$	$g(x) = -\frac{9}{4} x  + 1$	$g(x) = \frac{9}{4}(x - 8) + \frac{7}{4}$
$-\frac{5}{6}f(x + 2) - 10$	① Reflect over x-axis ② Compression ③ Left 2 ④ Down 10	$g(x) = -\frac{5}{2}x - \frac{115}{6}$	$g(x) = -\frac{5}{12} x - 3  - \frac{25}{6}$	$g(x) = \frac{5}{2} x + 8  - 10$	$g(x) = -\frac{5}{2}x - \frac{65}{6}$
$10f(x) - 100$	① stretch ② down 100	$g(x) = 30x - 50$	$g(x) = 5 x - 5  - 170$	$g(x) = -30 x + 6  - 100$	$g(x) = 30(x - 2) - 90$

