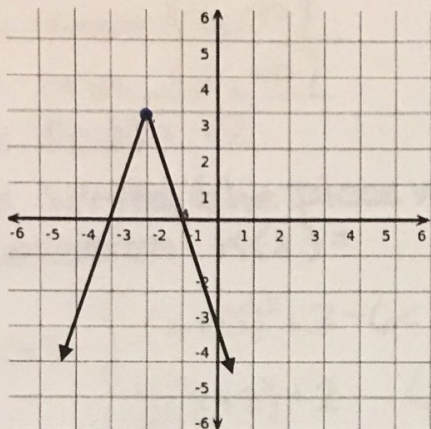


# Unit 1 Review

Name: Key

1) Given:



Domain:  $(-\infty, \infty)$

Range:  $(-\infty, 3]$

Increasing:  $(-\infty, -2)$

Decreasing:  $(-2, \infty)$

Write the function:  $f(x) = -3|x+2| + 3$

1. Consider the function  $f(x) = \begin{cases} 2x - 5 & \text{if } x < -2 \\ x^2 - 4x - 5 & \text{if } -2 \leq x \leq 5 \\ 15 - 4x & \text{if } x > 5 \end{cases}$

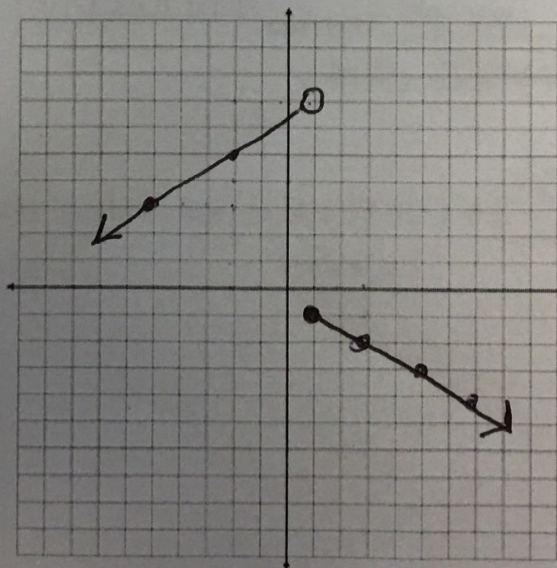
a. Evaluate  $f(4)$ .  $4^2 - 4(+4) - 5 = -5$

b. Evaluate  $f(-2)$ .  $(-2)^2 - 4(-2) - 5 = 7$

2. Explain which part of the function you would use to evaluate  $f(5)$ .

2nd  $x=5$

3. Use the coordinate plane below to graph the function  $g(x) = \begin{cases} \frac{2}{3}(x+2) + 5 & \text{if } x < 1 \\ -\frac{1}{2}(x-3) - 2 & \text{if } x \geq 1 \end{cases}$



Domain  $(-\infty, \infty)$

Range  $(-\infty, 7)$

Increasing  $(-\infty, 1)$

Decreasing  $[1, \infty)$

Give the domain and range of  $k(x)$ , graphed here.

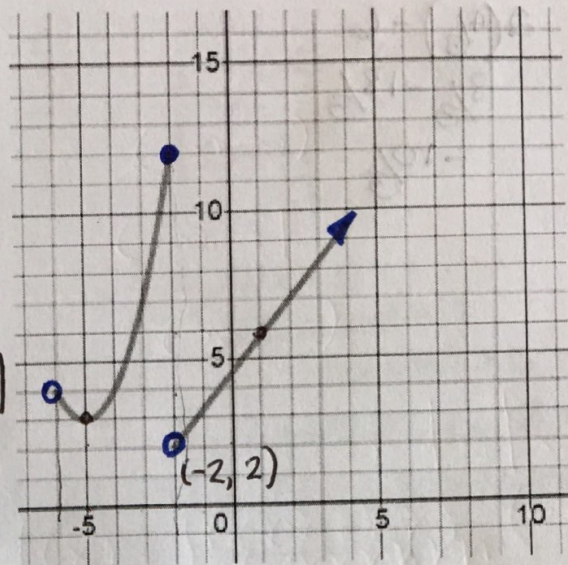
a. Domain:  $(-6, \infty)$

b. Range:  $(2, \infty)$

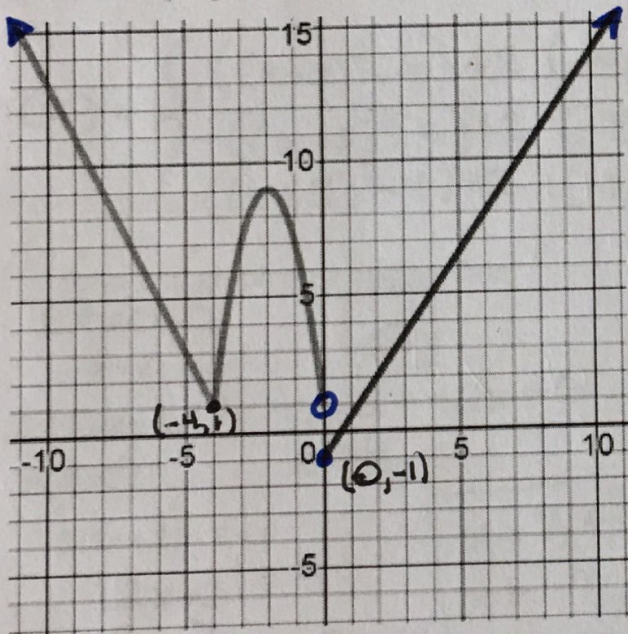
c.  $f(-2) = 12$

d. Write the piecewise function  $k(x) =$

$$f(x) = \begin{cases} (x+5)^2 + 3 & -6 < x \leq -2 \\ \frac{5}{4}(x+2) + 2 & (-2, \infty) \end{cases}$$



5. Given the graph of  $g(x)$  below, answer the following questions.



a. Complete the function for this graph:

$$g(x) = \begin{cases} -2(x+4) + 1 & \text{if } x < -4 \\ -2(x+2)^2 + 9 & \text{if } [-4, 0] \\ \frac{3}{2}(x) - 1 & \text{if } [0, \infty) \end{cases}$$

b. Evaluate  $g(4) = 5$

c. Find the rate of change from  $x = -10$  to  $x = -5$ .  $-2$

d. When asked for  $g(0)$ , Kevin answered  $-1$ , and Gustav answered  $1$ . According to the function you created in part a, which student is correct? Kevin Explain.

b/c closed circle at  $(0, -1)$

6. Re-express as a piecewise function:  $h(x) = |x + 3|$ .  $h(x) = \begin{cases} -(x+3) & \text{if } (-\infty, -3) \\ (x+3) & \text{if } [-3, \infty) \end{cases}$   
 $\vee (-3, 0)$

7. Solve each of the following:

a.  $|x - 3| = 6$

$x - 3 = 6$     $x - 3 = -6$   
 $x = 9$     $x = -3$

b.  $-2|3x + 2| = -10$

$|3x + 2| = 5$   
 $3x + 2 = 5$     $3x + 2 = -5$   
 $x = 1$     $x = -7/3$

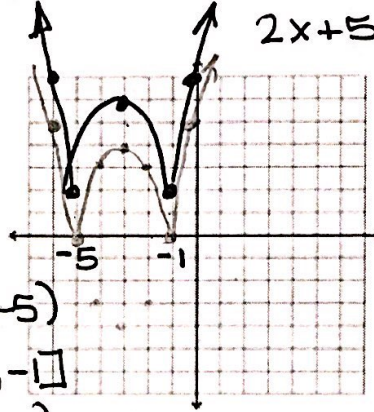
c.  $4 \leq |2x + 8| + 6$   
 $|2x + 8| \geq -2$   
 $\mathbb{R}$

d.  $3|2x + 5| - 1 > 17$

$3|2x + 5| > 18$   
 $|2x + 5| > 6$   
 $2x + 5 > 6$  or  $2x + 5 < -6$   
 $x > 1/2$  or  $x < -11/2$

8. Graph  $m(x) = |(x + 3)^2 - 4| + 2$

$V(-3, -4)$



Write as piece wise

$$m(x) = \begin{cases} ((x+3)^2 - 4) + 2 & (-\infty, -5) \\ -((x+3)^2 - 4) + 2 & [-5, -1] \\ ((x+3)^2 - 4) + 2 & (-1, \infty) \end{cases}$$

9) Solve and graph on a number line:

Check  $\rightarrow$

a)  $|4x - 2| = 2x - 6$

$\emptyset$

$4x - 2 = 2x - 6$     $4x - 2 = -2x + 6$   
 $x = 2$     $x = 4/3$

b)  $5 - 2|x - 1| = 9$

$\emptyset$

$-2|x - 1| = 4$   
 $|x - 1| = -2$

c)  $3|2x + 3| - 6 = 6$

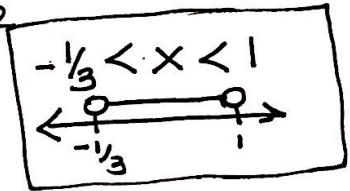
$|2x + 3| = 4$

$x = 1/2$  or  $x = -7/2$

$2x + 3 = 4$     $2x + 3 = -4$

d)  $|3x - 1| + 4 < 6$

$|3x - 1| < 2$



$-2 < 3x - 1 < 2$

e)  $3 - 2|x + 4| > 3$

$-2|x + 4| > -6$

$|x + 4| < 3$

$-7 < x < -1$

f)  $5 + |6x + 3| < 2$

$|6x + 3| < -3$

$\emptyset$

g)  $\frac{|3x + 2|}{-4} < -2$

$|3x + 2| > 8$  or  $3x + 2 > 8$  or  $3x + 2 < -8$

$x > 2$  or  $x < -10/3$

h)  $3|4 - x| > -12$

$|4 - x| > -4$

$\mathbb{R}$

10.) Graph:  $f(x) = \frac{-1}{2}|x + 3| + 4$

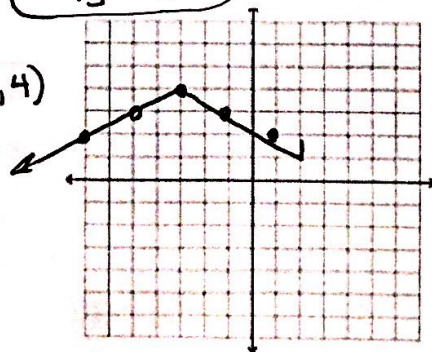
$V(-3, 4)$

Domain:  $(-\infty, \infty)$

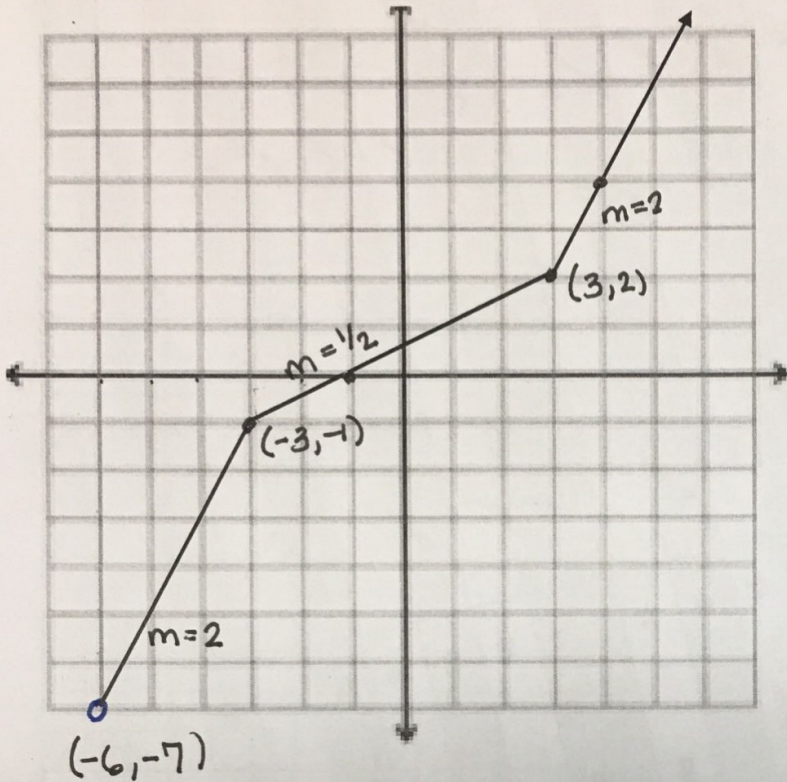
Range:  $(-\infty, 4)$

Increasing:  $(-\infty, -3)$

Decreasing:  $(-3, \infty)$

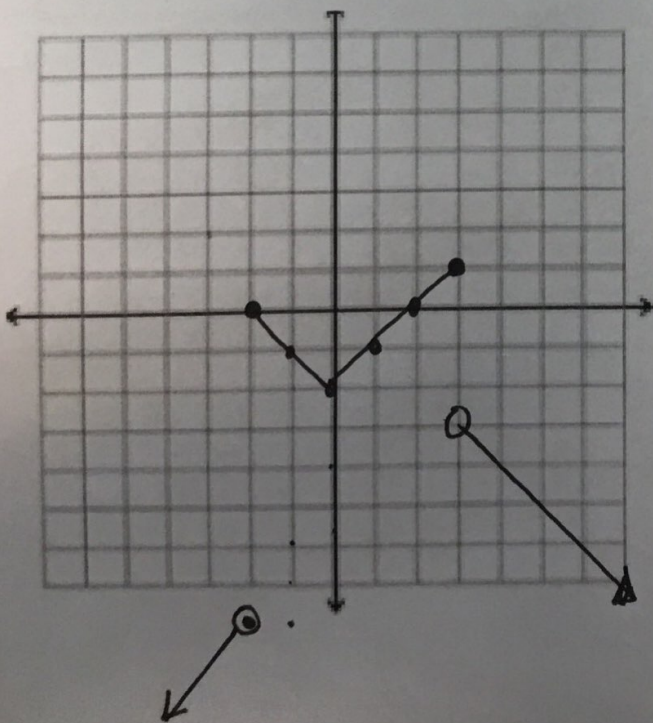


11) Write the piece wise function  $f(x)$ :



$$f(x) = \begin{cases} 2(x+6) - 7 & (-6, -3] \\ \frac{1}{2}(x+3) - 1 & (-3, 3] \\ 2(x-3) + 2 & (3, \infty) \end{cases}$$

12) Graph:  $f(x) = \begin{cases} 2x - 4, & x < -2 \\ |x| - 2, & -2 \leq x \leq 3 \\ -x, & x > 3 \end{cases}$



Domain  $(-\infty, \infty)$   
Range  $(-\infty, \square]$