AGS 2
Module 04 Review

Name Key
Period ______

1. Solve each of these equations for their solution(s).

a) $|x| = 20$

$\boxed{x = 20}$ $\boxed{x = -20}$

b) $|x - 2| = 11$

$x - 2 = 11$, $+2$ $+2$, $\boxed{x = 13}$

$x - 2 = -11$, $+2$ $+2$, $\boxed{x = -9}$

c) $|x + 6| = 3$

$x + 6 = 3$, -6 -6, $\boxed{x = -3}$

$x + 6 = -3$, -6 -6, $\boxed{x = -9}$

d) $3|x - 2| = 24$

$\frac{3|x-2|}{3} = \frac{24}{3}$

$|x - 2| = 8$

$x - 2 = 8$, $+2$ $+2$, $\boxed{x = 10}$

$x - 2 = -8$, $+2$ $+2$, $\boxed{x = -6}$

e) $7|2x - 5| + 4 = 18$

-4 -4

$\frac{7|2x-5|}{7} = \frac{14}{7}$

$|2x - 5| = 2$

$2x - 5 = 2$, $+5$ $+5$, $\frac{2x}{2} = \frac{7}{2}$, $\boxed{x = 7/2}$

$2x - 5 = -2$, $+5$ $+5$, $\frac{2x}{2} = \frac{3}{2}$, $\boxed{x = 3/2}$

f) $\frac{3}{4}|x + 1| - 5 = 13$

$+5$ $+5$

$\frac{4}{3} \cdot \frac{3}{4}|x+1| = 18 \cdot \frac{4}{3}$

$|x + 1| = 24$

$x + 1 = 24$, -1 -1, $\boxed{x = 23}$

$x + 1 = -24$, -1 -1, $\boxed{x = -25}$

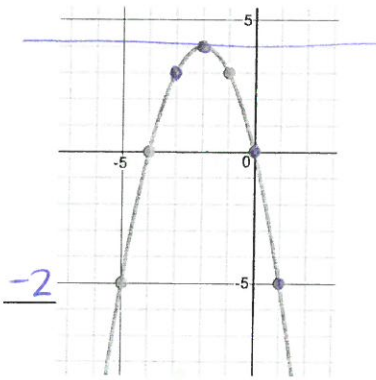
2. Use the Graph to determine the indicated function values.

a) $f(0) =$ 0

$f(-3) =$ 3

$f(1) =$ -5

If $f(x) = 4$, $x =$ -2



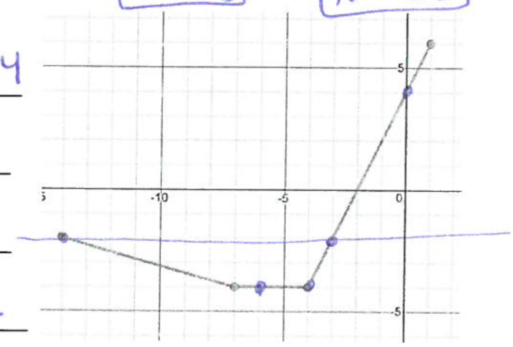
b) $g(-4) =$ -4

$g(0) =$ 4

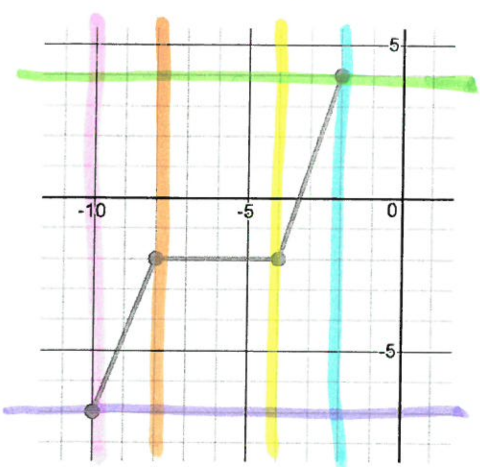
$g(-6) =$ -4

$g(-14) =$ -2

If $g(x) = -2$, $x =$ -14, -3



3. State the domain of each piece, then the domain and range of the entire graph.



Interval 1 $-10 \le x \le -8$

Interval 2 $-8 < x \le -4$

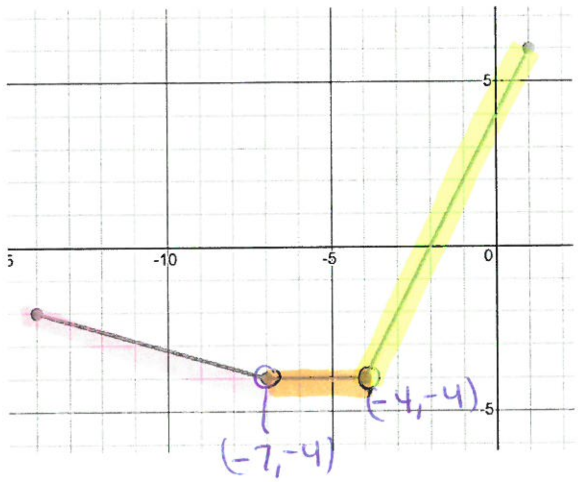
Interval 3 $-4 < x \le -2$

Domain $-10 \le x \le -2$

Range $-7 \le y \le 4$

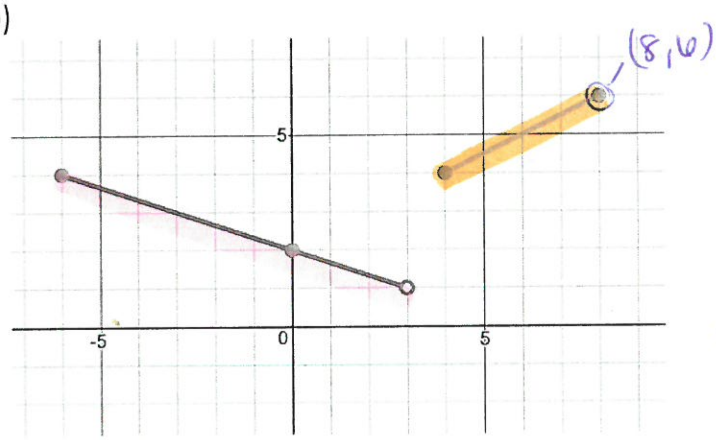
4. Find the piecewise function for each of the graphs. Use domain restrictions and use proper notation.

a)



$$f(x) = \begin{cases} -\frac{1}{3}(x+7)-4, & -14 \le x \le -7 \\ -4, & -7 < x \le -4 \\ 2x+4, & -4 < x \le 1 \end{cases}$$

b)

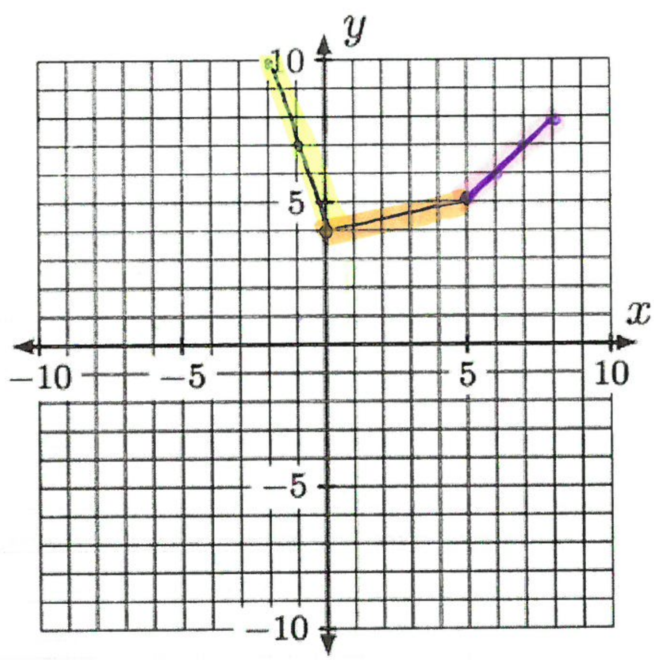


$$f(x) = \begin{cases} -\frac{1}{3}x+2, & -6 \le x < 3 \\ \frac{1}{2}(x-8)+6, & 4 \le x \le 8 \end{cases}$$

*you can use point-slope or slope-intercept

5. Graph this piecewise function.

$$f(x) = \begin{cases} y = x\ , & 5 \le x \le 8 \\ y = \frac{1}{5}x + 4\ , & 0 \le x < 5 \\ y = -3x + 4\ , & -2 \le x < 0 \end{cases}$$

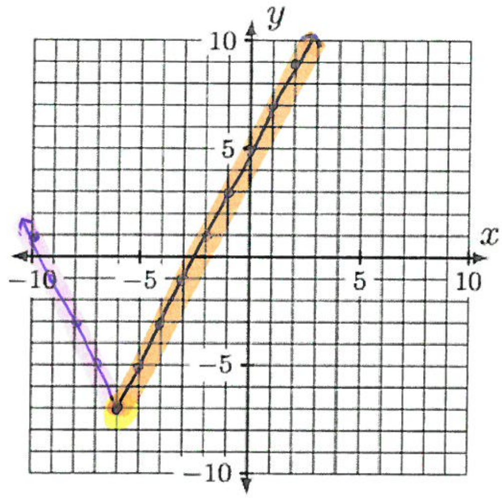


6. Write the absolute value function for the piecewise function

$g(x) = \begin{cases} -2(x+6)-7, & x < -6 \\ 2(x+6)-7, & x \geq -6 \end{cases}$ then graph the function and identify the vertex.

$g(x) =$ $2|x+6|-7$

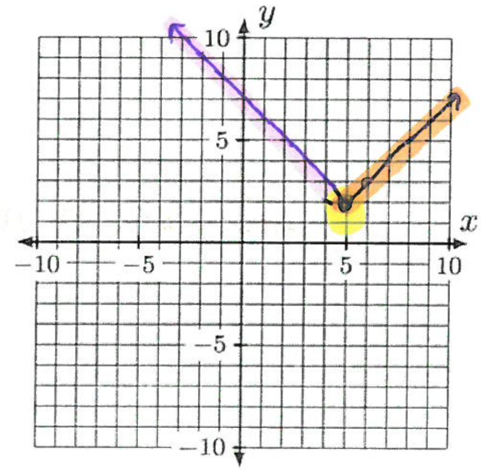
Vertex: $(-6, -7)$



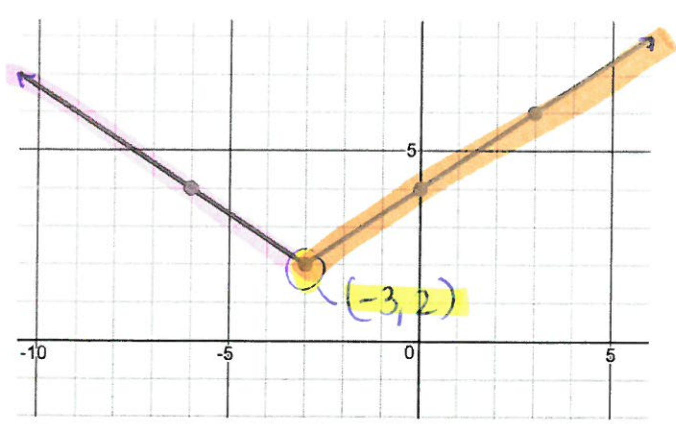
7. Write the piecewise function for the absolute value function $f(x) = |x-5| + 2$, then graph the function and identify the vertex.

$g(x) = \begin{cases} -1(x-5)+2, & x < 5 \\ 1(x-5)+2, & x \geq 5 \end{cases}$

Vertex: $(5, 2)$



8. Given the graph, g(x), find the piecewise function and the absolute value function



Abs. Value: $g(x) =$ $\frac{2}{3}|x+3|+2$

Piecewise: $g(x) = \begin{cases} \frac{2}{3}(x+3)+2, & x < -3 \\ -\frac{2}{3}(x+3)+2, & x \geq -3 \end{cases}$

9. Find the inverse of each relation shown below. Determine whether the inverse is a function or not. Explain why or why not.

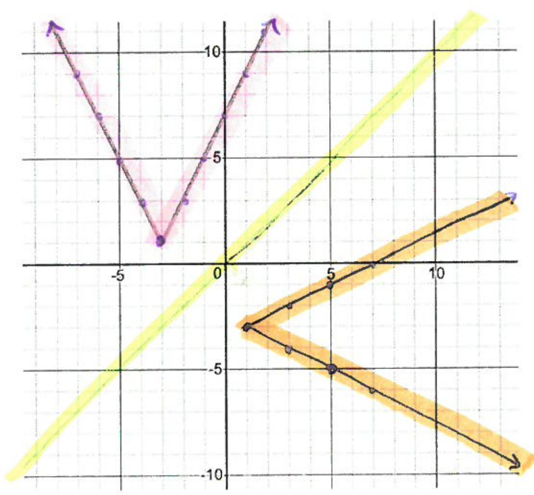
x	2	1	0	-1	-2
f(x)	5	2	1	2	5

Inverse:

x	5	2	1	2	5
$f^{-1}(x)$	2	1	0	-1	-2

not a function because one x-value corresponds to multiple unique y-values.

10. Given the graph below, draw in the line of reflection (y = x). Then graph the inverse of the function. Determine if the inverse is a function or not. Explain why or why not.



x	f(x)
-5	5
-4	3
-3	1
-2	3
-1	5

x	$f^{-1}(x)$
5	-5
3	-4
1	-3
3	-2
5	-1

not a function because one x-value corresponds to multiple unique y-values.

11. Find the inverse for each function.

a) $f(x) = 2x - 6$

$y = 2x - 6$

$x = 2y \cancel{-6}$
$+6 \qquad \cancel{+6}$

$\frac{x+6}{2} = \frac{2y}{2}$

$y = \frac{x+6}{2}$

$\boxed{f^{-1}(x) = \frac{1}{2}x + 3}$

b) $f(x) = \sqrt{2x - 8}$

$y = \sqrt{2x-8}$

$x^2 = \sqrt{2y-8}^{\,2}$

$x^2 = 2y - 8$
$+8 \qquad +8$

$\frac{x^2+8}{2} = \frac{\cancel{2}y}{\cancel{2}}$

$y = \frac{1}{2}x^2 + 4$

$\boxed{f^{-1}(x) = \frac{1}{2}x^2 + 4}$

c) $f(x) = \frac{x-12}{3}$

$y = \frac{x-12}{3}$

$3 \cdot x = \frac{y-12}{3} \cdot 3$

$3x = y \cancel{-12}$
$+12 \qquad \cancel{+12}$

$y = 3x + 12$

$\boxed{f^{-1}(x) = 3x + 12}$