

Math 3 Unit 1 Test Review

Name: Key

- I. Skills throughout the unit
- A. Graphing linear, quadratic
 - B. Writing equations of linear, quadratic
 - C. Average Rate of Change
- II. Absolute Value
- A. Solving
 - B. Writing as a piecewise function
 - C. Graphing
 - D. Domain and Range

- III. Piecewise
- A. Graphing
 - B. Writing an equation from a graph
 - C. Interpreting a graph
 - D. Find $f(x)$ from a piecewise function

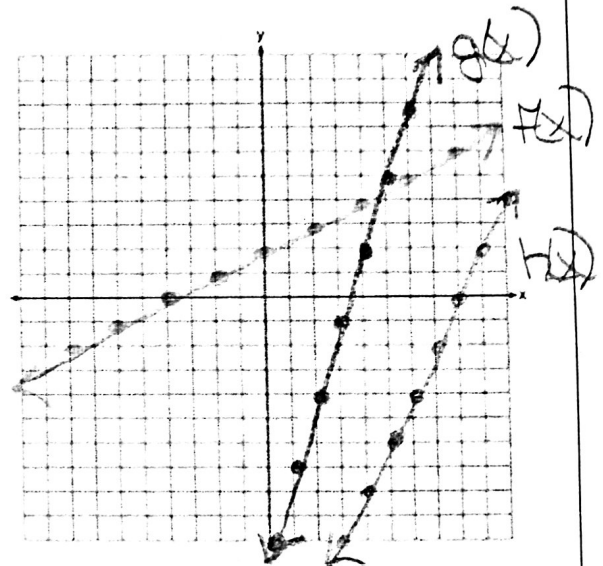
Practice:

3x-10

Given the following functions: $f(x) = \frac{1}{2}(x + 4)$, $g(x) = 3x - 10$, $h(x) = 2(x - 5) - 6$

- Graph and label the functions on the graph at right. Use different colors
- State the domain and range of each function:

Function	Domain	Range
$f(x) = \frac{1}{2}(x + 4)$	$(-\infty, \infty)$	$(-\infty, \infty)$
$g(x) = 3x - 10$	$(-\infty, \infty)$	$(-\infty, \infty)$
$h(x) = 2(x - 5) - 6$	$(-\infty, \infty)$	$(-\infty, \infty)$

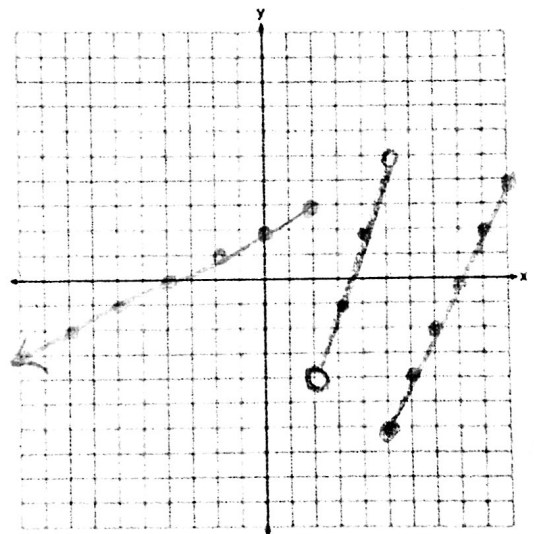


- Graph the following function:

$$k(x) = \begin{cases} \frac{1}{2}(x + 4), & x \leq 2 \\ 3x - 10, & 2 < x < 5 \\ 2(x - 5) - 6, & 5 \leq x < 10 \end{cases}$$

- Use the equation or the graph to find the following:

- a. $k(-2) = 1$
- b. $k(0) = 2$
- c. $k(1) = \frac{5}{2}$ (2.5)
- d. $k(2) = 3$
- e. $k(3) = -1$
- f. $k(4) = 2$
- g. $k(5) = -6$
- h. $k(10) = 4$



5. You are buying tee shirts for the math club. The pricing of the shirts is given by the following function: $c(x) = \begin{cases} 15x & \text{if } 1 \leq x \leq 10 \\ 12x & \text{if } 11 \leq x \leq 20 \\ 10x & \text{if } 21 \leq x < \infty \end{cases}$ (where x is an integer)

a. If 43 members of the math club order tee shirts, what is x ? 43

What is the total cost of the tee shirts? \$430 How much will each member pay? \$10
 $10(43)$

b. If only 5 members of the club order tee shirts, how much will each member pay? \$15

c. Which order costs less: 10 shirts or 11 shirts? 11 shirts
 $15(10) = \$150$ $12(11) = \$132$

If 10 members want to buy shirts, how many shirts should be ordered so that each member gets a shirt and the cost is minimized? 11 shirts

6. Write an equation for the following functions; state their domains and ranges:

Equation: $f(x) = (x-3)^2 - 4$

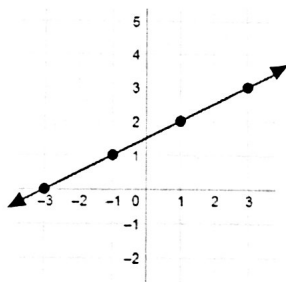
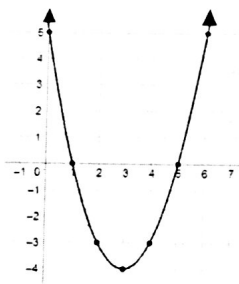
Equation: $g(x) = \frac{1}{2}(x-1) + 2$
 * Could use different point

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

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

Range: $[-4, \infty)$

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

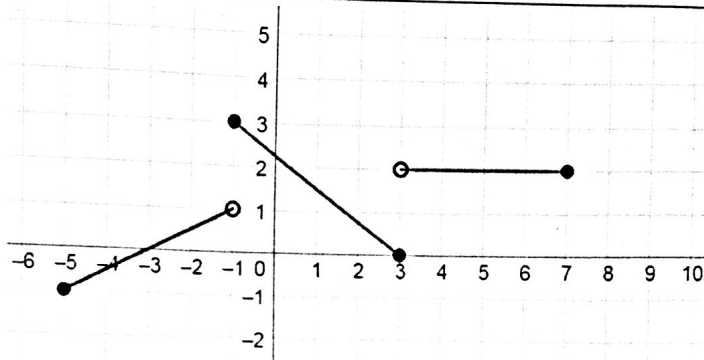


7. Write the equation of $y = |x - 3|$ in piecewise notation.

$$y = \begin{cases} -(x-3), & x < 3 \\ (x-3), & x \geq 3 \end{cases}$$

8. Fill in the blanks to complete the equation of the following piecewise function:

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



9. Given the graph above, find the average rate of change of $f(x)$ on each interval.

Interval	Average Rate of Change
$-5 \leq x \leq -3$	$\frac{1}{2}$
$-1 \leq x \leq 3$	$-\frac{3}{4}$
$4 \leq x \leq 5$	0

10. Find the value(s) of x where $f(x) = 0$.

$x = -3, 3$

11. Solve the following absolute value equations/inequalities:

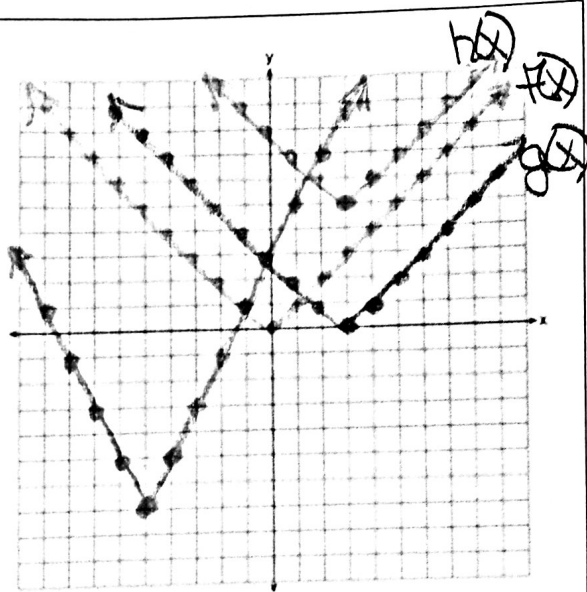
Inequality	Solution	Follow up question:
A. $ x - 3 < 5$	$x - 3 < 5$ $x < 8$ $x - 3 > -5$ $x > -2$ $\{-2 < x < 8\}$	Is $x = 8$ in the solution set? No, 8 is not between -2 and 8, non-inclusive.
B. $ x - 3 > 5$	$x - 3 > 5$ $x > 8$ $x - 3 < -5$ $x < -2$ $\{x < -2 \text{ or } x > 8\}$	Is $x = 12$ in the solution set? Yes, because 12 is greater than 8
C. $ 7 - 9k = 43$	$7 - 9k = 43$ $-9k = 36$ $k = -4$ $7 - 9k = -43$ $-9k = -50$ $k = \frac{50}{9}$ $\{-4, \frac{50}{9}\}$	Can absolute value ever be equal to a negative? No, distance can't be negative.
D. $ n - 1 - 7 > -3$	$(n - 1) - 7 > -3$ $n - 8 > -3$ $n > 5$ $-(n - 1) - 7 > -3$ $-n - 6 > -3$ $-n > 3$ $n < -3$ $\{n < -3 \text{ or } n > 5\}$	Is $x = -6$ in the solution set? Yes, because -6 is less than -3

12. Graph and label the functions on the graph below.

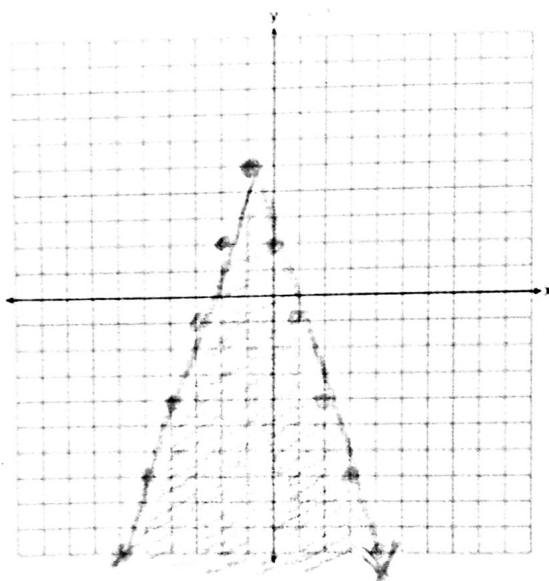
$$\begin{aligned} f(x) &= |x| \\ g(x) &= |x - 3| \\ h(x) &= |x - 3| + 5 \\ j(x) &= 2|x + 5| - 7 \end{aligned}$$

State the domain and range of each function:

Function	Domain	Range
$f(x) = x $	$(-\infty, \infty)$	$[0, \infty)$
$g(x) = x - 3 $	$(-\infty, \infty)$	$[0, \infty)$
$h(x) = x - 3 + 5$	$(-\infty, \infty)$	$[5, \infty)$
$j(x) = 2 x + 5 - 7$	$(-\infty, \infty)$	$[-7, \infty)$



13. Graph $y \leq -3|x + 1| + 5$



Look back over the HW and quizzes and make sure you can do the following before tomorrow.

___ I can identify the functions that make up a piecewise function and their domains

___ I can use function notation to represent a piecewise function

___ I can connect representations of a piecewise function to the context of a situation

___ I can graph a piecewise function given the equation

___ I can identify the average rate of change for an interval and connect it to context

___ I can rewrite an absolute value function as a piecewise function

___ I can graph an absolute value function

___ I can solve an absolute value equation or inequality

___ I can describe the effect of taking the absolute value of a function on the graph of that function