Key

Algebra 2 Chapter 2 Pre-Test

1.) (8 pts total, 4 pts each) For the following function, determine f(3) and f(-2).

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

$f(3) = (3)^2 - 4(3) + 5$

$9 - 12 + 5$

$-3 + 5$

(2)

$f(-2) = (-2)^2 - 4(-2) + 5$

$4 + 8 + 5$

$12 + 5$

(17)

b) $f(x) = \frac{5x-6}{2x}$

$\frac{5(3)-6}{2(3)}$

$\frac{15-6}{6} = \frac{9}{6} = \boxed{\frac{3}{2}}$

$\frac{5(-2)-6}{2(-2)}$

$\frac{-10-6}{-4} = \frac{-16}{-4} = \boxed{4}$

2.) (8 pts total, 4 pts each) Suppose $f(x) = 3x - 5$ and $g(x) = x^2 + 6$

a) Find $\frac{g(3)}{f(2)}$.

For what value(s) of x would $\frac{g(x)}{f(x)}$ not be a function, if any.

$f(x) \neq 0$ since $f(x)$ is in the denominator

$3x - 5 \neq 0$

$+5 \quad +5$

$\frac{3x}{3} \neq \frac{5}{3}$

$\boxed{x \neq \frac{5}{3}}$

$\frac{(3)^2+6}{3(2)-5} = \frac{9+6}{6-5} = \frac{15}{1} = \boxed{15}$

b) Find $f(-1) \cdot g(0)$

For what value(s) of x would $f(x) \cdot g(x)$ not be a function, if any.

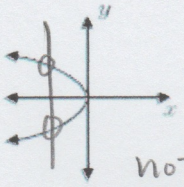
$f(x) \cdot g(x)$ ok for all real numbers

$(3(-1)-5)((0)^2+6)$

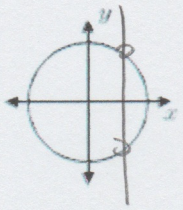
$(-3-5)(6)$

$(-8)(6) = \boxed{-48}$

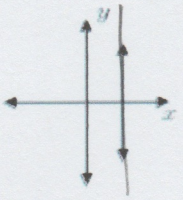
3.) (8 pts total, 2 pts each) Which of the following graphs represents a function? Write either "function" or "not a function".

a) 

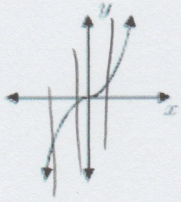
not a function

b) 

not a func

c) 

not a function

d) 

function

4.) (8 pts total, 4 pts each) Write the equation for the line formed by each slope and point. Include <u>both</u> slope-intercept and point-slope forms.

a) (-2, 4), m = -3

$y - y_1 = m(x - x_1)$

$y - 4 = -3(x - (-2))$

$y - 4 = -3(x + 2)$ point-slope

$y - 4 = -3(x + 2)$

$y - 4 = -3x - 6$

$+4 \quad +4$

$y = -3x - 2$ slope-intercept

b) (0, -5), m = ½

$y - (-5) = \frac{1}{2}(x - 0)$

$y + 5 = \frac{1}{2}(x - 0)$ point-slope

$y + 5 = \frac{1}{2}x$

$-5 \quad -5$

$y = \frac{1}{2}x - 5$ slope-intercept

5.) (8 pts total, 4 pts each) Find the slope and intercepts for each of the following lines:

a) $4x + 6y = -12$ (A, B, C)

$Ax + By = C$

$-\frac{A}{B} = \text{slope}$

$-\left(\frac{4}{6}\right) = -\frac{2}{3}$

Check

$4x + 6y = -12$

$-4x \quad -4x$

$\frac{6y}{6} = \frac{-4x}{6} - \frac{12}{6}$

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

y-int, $x = 0$

$4(0) + 6y = -12$

$\frac{6y}{6} = \frac{-12}{6}$

$y = -2$

x-int, $y = 0$

$4x + 6(0) = -12$

$\frac{4x}{4} = \frac{-12}{4}$

$x = -3$

b) $7x - 2y = 10$

$\text{slope} = -\frac{A}{B}$

$-\left(\frac{7}{-2}\right) = \frac{7}{2}$

y-int, $x = 0$

$7(0) - 2y = 10$

$\frac{-2y}{-2} = \frac{10}{-2}$

$y = -5$

x-int, $x = 0$

$7x - 2(0) = 10$

$\frac{7x}{7} = \frac{10}{7}$

$x = \frac{10}{7}$

6.) (8 pts total, 4 pts each) Find the slope for each of the following:

a) (-5, 3) and (7, -1)

$x_1, y_1 \quad x_2, y_2$

$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$

$\frac{-1-3}{7-(-5)} = \frac{-4}{12} = -\frac{1}{3}$

b) (-2, 6) and (4, -9)

$x_1, y_1 \quad x_2, y_2$

$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$

$\frac{-9-6}{4-(-2)} = \frac{-15}{6} = -\frac{5}{2}$

7.) (8 pts total, 4 pts each) Graph each of the following equations:

a) 5x - 10y = 20

$x = 0$

$-10y = 20$

$\frac{-10y}{-10} = \frac{20}{-10}$

$y = -2$

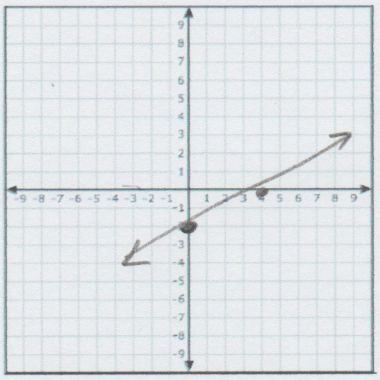
$(0, -2)$

$y = 0$

$5x = 20$

$x = 4$

$(4, 0)$



b) 16x + 8y = 48

$x = 0$

$\frac{8y}{8} = \frac{48}{8}$

$y = 6$

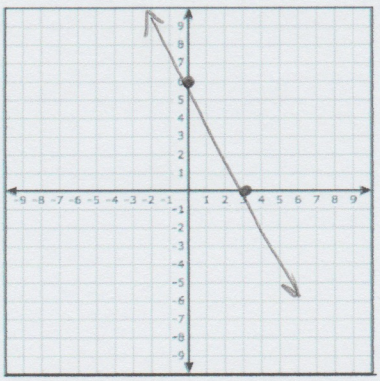
$(0, 6)$

$y = 0$

$\frac{16x}{16} = \frac{48}{16}$

$x = 3$

$(3, 0)$



8.) (8 pts total, 4 pts each) Determine the equation for each of the following:

a) Write the equation for a line through (-2, 7) and perpendicular to y = -2x + 5.

perpendicular = negative inverse

$m = -2$

negative inverse = $\frac{1}{2}$

$y - y_1 = m(x - x_1)$

$y - 7 = \frac{1}{2}(x - (-2))$

$y - 7 = \frac{1}{2}(x + 2)$

$y - 7 = \frac{1}{2}x + 1$

$+7 \quad +7$

$y = \frac{1}{2}x + 8$

b) Write the equation for a line parallel to y = 3x - 2 that passes through (1, -3)

parallel means equal slope $m = 3$

$y - y_1 = m(x - x_1)$

$y - (-3) = 3(x - 1)$

$y + 3 = 3x - 3$

$-3 \quad -3$

$y = 3x - 6$

9.) (8 pts total, 4 pts each) Each of the following depicts a direct variation function. For each, find the constant of variation and show the relationship in an equation.

a) If y = 12 when x = 3

Find y when x = 9

$\frac{12}{3} = \frac{3k}{3}$ $\quad 4 = k$ = constant of variation

$y = kx$ $\quad y = 4x$

$y = 4(9) = \boxed{36}$

b) If y = -6 when x = 15

Find x when y = 2

$\frac{-6}{15} = \frac{15k}{15}$ $\quad y = \frac{-2}{5}x$

constant of variation $= \frac{-2}{5} = k$ $\quad \left(\frac{-5}{2}\right)(2) = \left(\frac{-2}{5}x\right)\left(\frac{-5}{2}\right)$

$\boxed{-5 = x}$

10.) (8 pts total, 4 pts each) For each of the following, determine whether y varies directly with x. If so, find the constant of variation and write the equation.

a)

Yes

constant of variation = slope (4)

Δx $x_2 - x_1$	x	y	Δy $y_2 - y_1$
	-1	-4	
3			12
	2	8	
1			4
	3	12	

slope $\Delta y / \Delta x$

$12/3 = 4$

$4/1 = 4$ } since the slope between the points are the same → it varies directly

b)

No

Δx $x_2 - x_1$	x	y	Δy $y_2 - y_1$
	-3	9	
3			-8
	0	1	
1			3
	1	4	

slope $\Delta y / \Delta x$

$-8/3$

$3/1$ } not the same, not direct variation

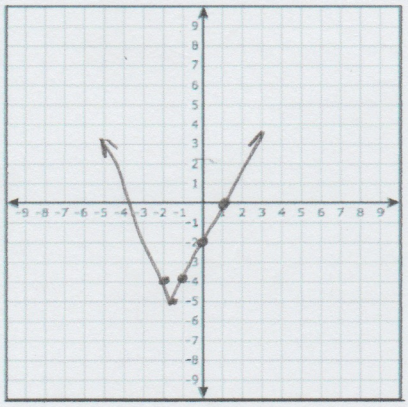
11.) (8 pts total, 4 pts each) For each of the following, find the vertex of the absolute value function. Then graph the function.

a) $f(x) = |2x + 3| - 5$

$f(x) = |mx+b| + k$

vertex: $\left(\frac{-b}{m}, k\right)$

$\left(-\frac{3}{2}, -5\right)$

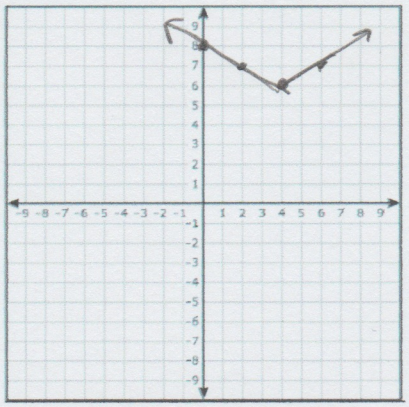


b) $f(x) = |1/2x - 2| + 6$

vertex: $\left(\frac{-b}{m}, k\right)$

$\left(-\left(\frac{-2}{\frac{1}{2}}\right), 6\right)$

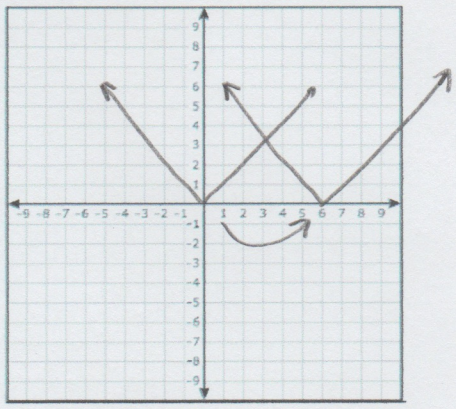
$(-(-4), 6)$ $(4, 6)$



12.) (8 pts total, 4 pts each) For each of the following, find the vertex of the absolute value function. Then graph the function.

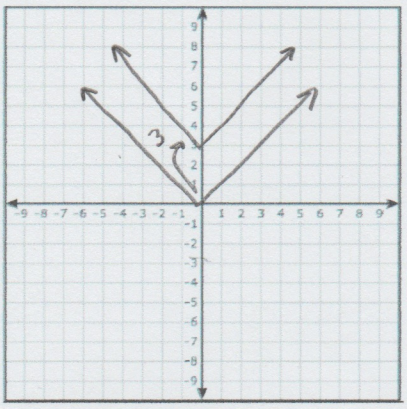
a) $f(x) = |x - 6|$

shift 6 to the right



b) $f(x) = |x| + 3$

shift up 3



13.) (4 pts total) Describe the shift of the graph from the parent function $f(x) = |x|$ in

$$f(x) = |x + 2| - 8$$

Left 2, down 8