

Name: _____
PC: Decomposition

Date: _____
Ms . Loughran

Do Now:

Find two functions f , g , and h such that $(g \circ f \circ h)(x) = k(x)$

1. $k(x) = \sqrt{2x-6} - 1$

$$h(x) = 2x - 6$$

$$f(x) = \sqrt{x}$$

$$g(x) = x - 1$$

2. $k(x) = \frac{1}{3x+3}$

$$k(x) = \frac{1}{3(x+1)}$$

$$h(x) = 3x$$

$$f(x) = x + 1$$

$$g(x) = \frac{1}{x}$$

$$h(x) = x + 1$$

$$f(x) = 3x$$

$$g(x) = \frac{1}{x}$$

Continuing in yesterday's packet...

4. State an equation of a line that contains the point whose coordinates are $(2, -3)$ and is parallel to the line whose equation is $2x + y - 6 = 0$.

$$y = -2x + b$$
$$m = -2$$

$$m_{\parallel} = -2$$

$$y + 3 = -2(x - 2) \quad \text{point slope}$$

5. State an equation of a line that contains the point whose coordinates are $(1, -2)$ and is perpendicular to the line whose equation is $x + 3y = 6$.

$$\frac{3y}{3} = \frac{-x + 6}{3 \cdot 3}$$

$$y = -\frac{1}{3}x + 2$$
$$m = -\frac{1}{3}$$

$$m_{\perp} = \frac{3}{1} \text{ or } 3$$

$$y + 2 = 3(x - 1)$$

$$(2009, 19), (2012, 24)$$

6. In 2009 Nike's net sales were 19 billion, and in 2012 net sales were 24 billion.

(a) Write a linear equation giving the net sales y in terms of the year x .

(b) Use the equation to estimate the net sales for 2015.

$$a) m = \frac{24 - 19}{2012 - 2009} = \frac{5}{3}$$

plugin $x = 2015$

$$b) y - 19 = \frac{5}{3}(2015 - 2009)$$

$$y - 19 = \frac{5}{3}(6)$$

$$y - 19 = 10$$

$$y = 29 \text{ billion}$$

$$(2009, 19)$$

$$y - 19 = \frac{5}{3}(x - 2009)$$

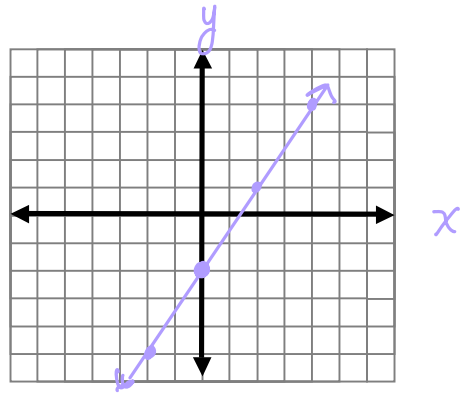
or $(2012, 24)$

$$y - 24 = \frac{5}{3}(x - 2012)$$

7. Graph $f(x) = \frac{3}{2}x - 2$

$$m = \frac{3}{2}$$

$$b = -2 \leftarrow y\text{-intercept}$$



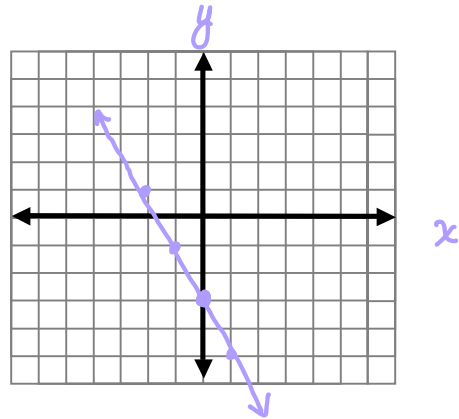
8. Graph $6x + 9 = -3y$

you could use calculator,
but might be easier just to use
the slope and y-intercept

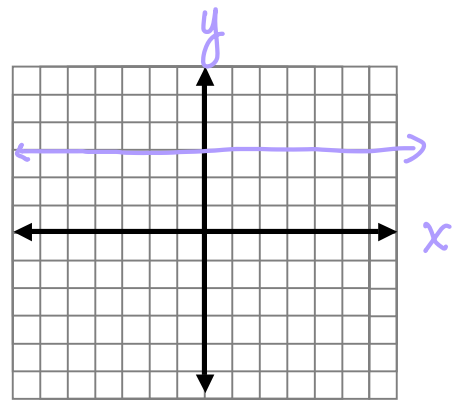
$$\frac{6x + 9}{-3} = \frac{-3y}{-3}$$

$$-2x - 3 = y \quad m = -2$$

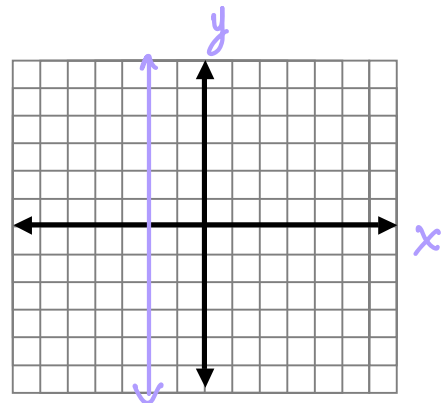
$$b = -3$$



9. Graph $y = 3$



10. Graph $x = -2$



11. What is the slope of the line $y = 3$?

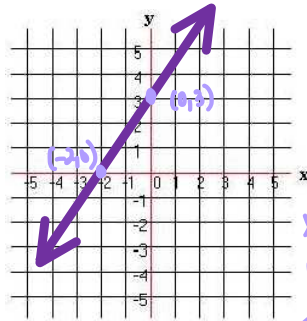
0

12. What is the slope of the line $x = -2$?

undefined

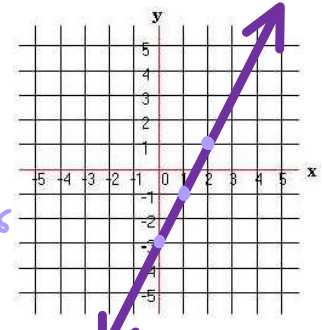
Write the equation of the line from graph and also write domain and range. Find x and y -intercepts. Determine whether or not each is a function.

13.



$m = \frac{3}{2}$
 $b = 3$
 $y = \frac{3}{2}x + 3$
 $D: (-\infty, \infty)$
 $R: (-\infty, \infty)$
 $x\text{-int: } (-2, 0)$
 $y\text{-int: } (0, 3)$
 Function

14.



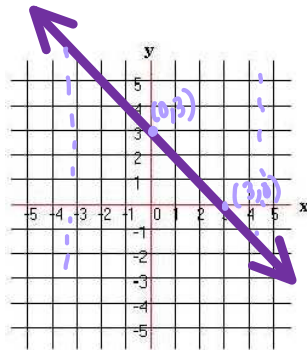
R
 \uparrow
 all real numbers

$m = 2$
 $b = -3$

To find x -int.
 (let $y = 0$)
 $0 = 2x - 3$
 $3 = 2x$
 $\frac{3}{2} = x$

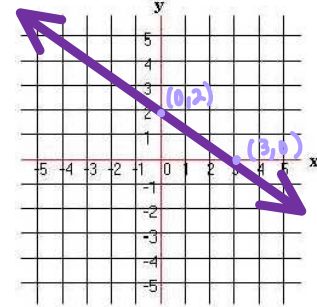
$y = 2x - 3$
 $D: (-\infty, \infty)$
 $R: (-\infty, \infty)$
 $x\text{-int: } (\frac{3}{2}, 0)$
 $y\text{-int: } (0, -3)$
 Function

15.



$m = -1$
 $b = 3$
 $y = -x + 3$
 $D: (-\infty, \infty)$
 $R: (-\infty, \infty)$
 $x\text{-int: } (3, 0)$
 $y\text{-int: } (0, 3)$
 Function

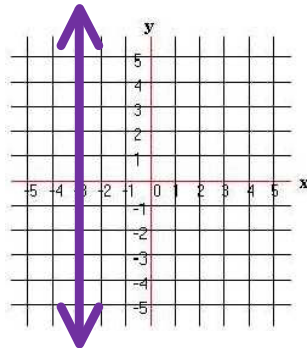
16.



$m = -\frac{2}{3}$
 $b = 2$
 $y = -\frac{2}{3}x + 2$
 $D: (-\infty, \infty)$
 $R: (-\infty, \infty)$
 $x\text{-int: } (3, 0)$
 $y\text{-int: } (0, 2)$

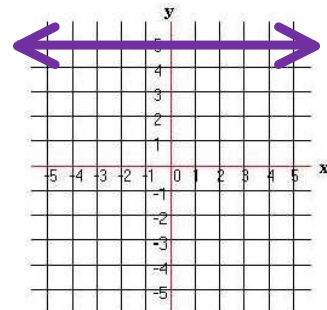
Function

17.



$x = -3$
 $D: \{-3\}$
 $R: (-\infty, \infty)$
 $x\text{-int: } (-3, 0)$
 $y\text{-int: none}$
 Not a function

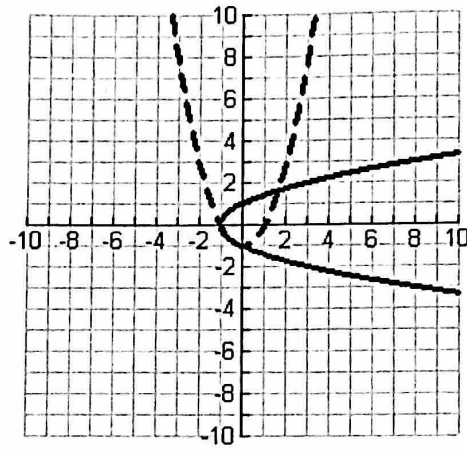
18.



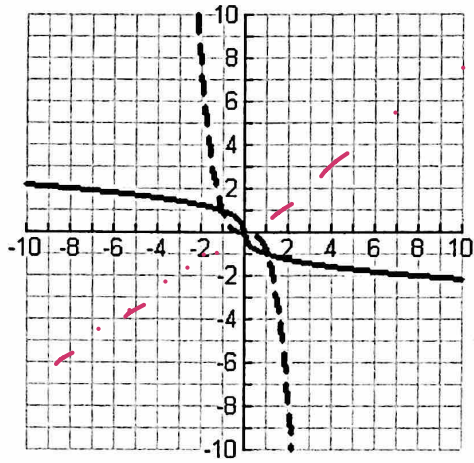
$y = 5$
 $D: (-\infty, \infty)$
 $R: \{5\}$
 $x\text{-int: none}$
 $y\text{-int: } (0, 5)$
 Function

Homework 10-19

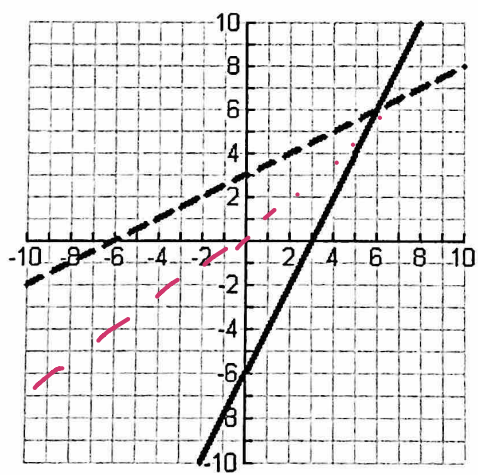
25.



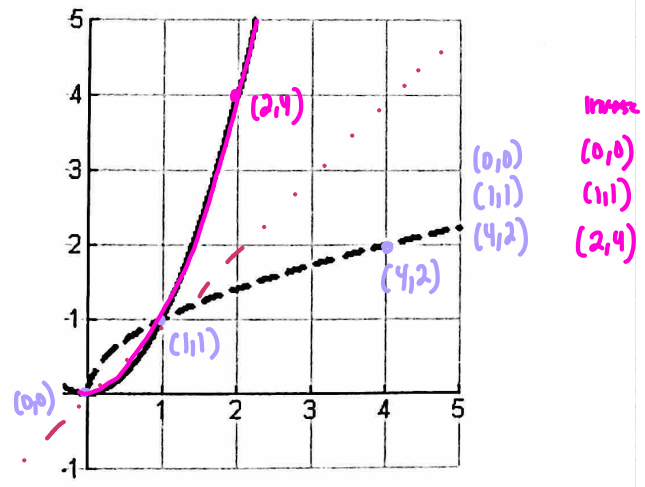
26.



27.



28.



Name: Kay
 PC: Function Practice

Date: _____
 Ms. Loughran

1. If $f(x) = x^2 + 2x + 5$ and $g(x) = x - 1$, then $f(g(x))$ is
- [1] $x^2 + 3x + 4$ [2] $x^2 + 4$ [3] $x^2 + 4x - 1$ [4] $x^2 - 1$

$$f(x-1) = (x-1)^2 + 2(x-1) + 5 = x^2 - 2x + 1 + 2x - 2 + 5 = x^2 + 4$$

2. For which value of x is $f(x) = -65$ given $f(x) = -3x^2 - 2x$?
- [1] 7 [2] -7 [3] 5 [4] -5

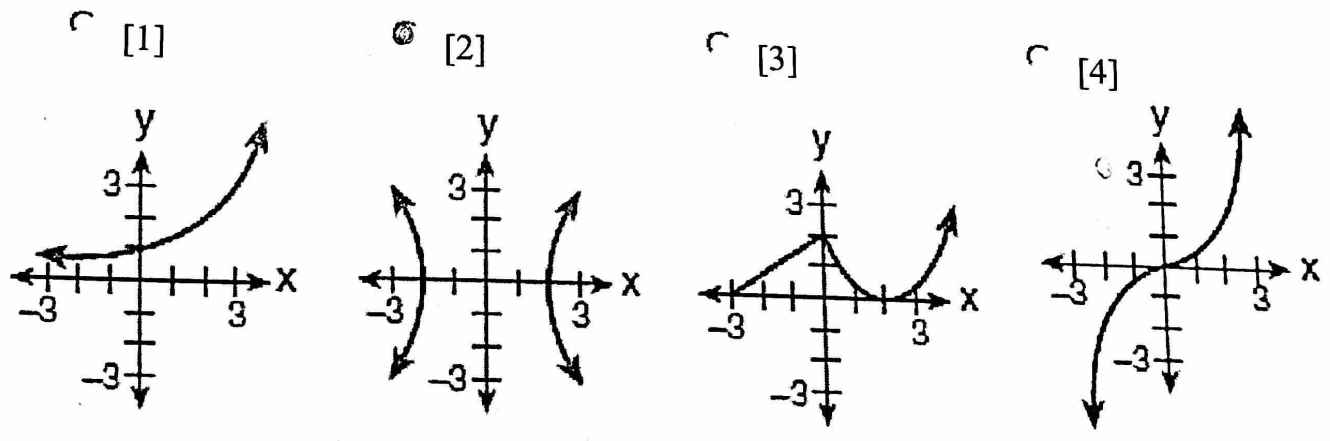
$$-65 = -3x^2 - 2x$$

plug in

$$\begin{aligned} -65 &\neq -3(7)^2 - 2(7) \\ -65 &\neq -3(-7)^2 - 2(-7) \\ -65 &\neq -3(5)^2 - 2(5) \\ -65 &= -3(-5)^2 - 2(-5) \quad \checkmark \end{aligned}$$

3. Which function is *not* one-to-one?
- [1] $\{(0,1), (1,2), (2,3), (3,4)\}$
 [2] $\{(0,0), (1,1), (2,2), (3,3)\}$
 [3] $\{(0,1), (1,0), (2,3), (3,2)\}$
 [4] $\{(0,1), (1,0), (2,0), (3,2)\}$

4. Which graph is *not* a function?



5. If the domain of $f(x) = 2x + 1$ is $\{-2 \leq x \leq 3\}$, which integer is *not* in the range?

- [1] -4 [2] -2 [3] 0 [4] 7

x	f(x)
-2	-3
-1	-1
0	1
1	3
2	5
3	7

$$g(-3) = \sqrt{1-(-3)} = 2$$

$$f(2) = 2^2 + 4 = 8$$

6. If $f(x) = x^2 + 4$ and $g(x) = \sqrt{1-x}$, what is the value of $f(g(-3))$?

- [1] 13 [2] 8 [3] 2 [4] $2i\sqrt{3}$

7. Which equation does *not* represent a function?

- [1] $y = 2x$ [2] $y = x^2 + 10$ [3] $y = 10/x$ [4] $x^2 + y^2 = 95$

8. What is the inverse of the function $y = 2x - 3$?

- [1] $y = \frac{x+3}{2}$ [2] $y = \frac{x}{2} + 3$ [3] $y = -2x + 3$ [4] $y = \frac{1}{2x-3}$

9. Given $g(x) = \frac{1}{x-4}$, find $g\left(\frac{2}{5}\right)$.

$$g\left(\frac{2}{5}\right) = \frac{1}{\frac{2}{5}-4} = \frac{1}{\frac{-18}{5}} = -\frac{5}{18}$$

- [1] $-5/3$ [2] $-5/18$ [3] $-18/5$ [4] $-3/5$

★ 10. The function $f(x) = 3x - 7$ is

- [1] one-to-one, but not onto
 [2] onto, but not one-to-one
 [3] both one-to-one and onto
 [4] neither one-to-one nor onto

11. The range of the function $f(x) = (x+6)^2$ is

- [1] All Reals [3] $[-6, \infty)$
 [2] $[6, \infty)$ [4] $[0, \infty)$