

Name: \_\_\_\_\_  
 Serafino · Algebra 2E

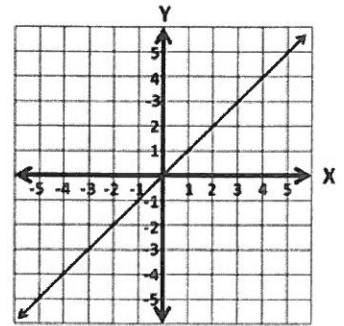
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2A

## Linear (& Piecewise) Functions

Notes & Practice Packet



Parent Function:  $f(x) = x$

Slope-Intercept Form:  $y = mx + b$

Point-Slope Form:  $y = m(x - x_1) + y_1$

Standard Form:  $Ax + By = C$

In this packet, we will:

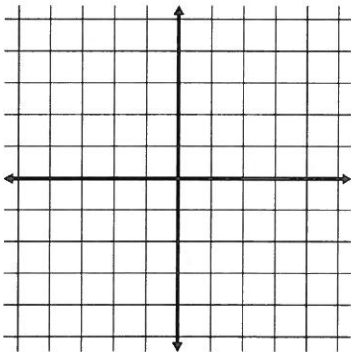
- Graph all 3 forms
- Convert between forms
- Write equations in all 3 forms given a situation
- Write equations given graphic requirements
- Solve equations in all 3 forms
- Write equations of piecewise functions
- Transform linear functions.

### 1. Graphing Linear Functions

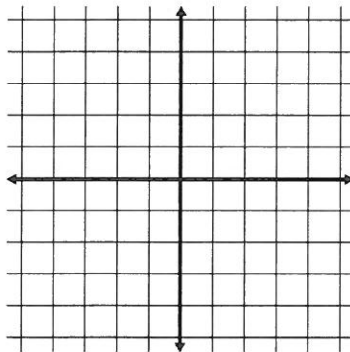
#### I. Slope - Intercept Form:

Graph each of the following. Then calculate the coordinates for the x-intercepts for each.

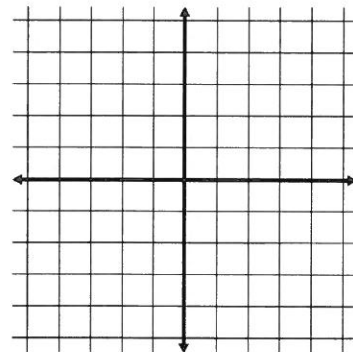
a)  $y = x$



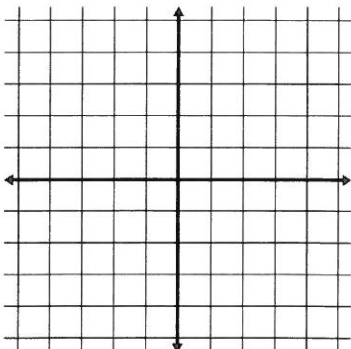
b)  $y = x - 2$



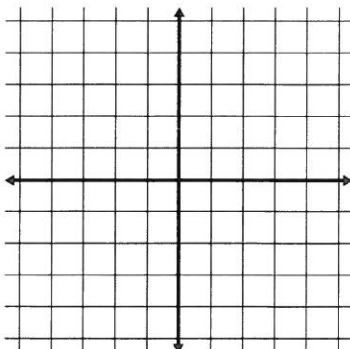
c)  $y = -x + 3$



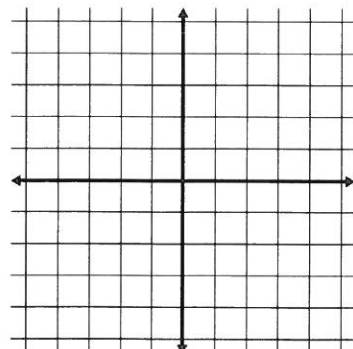
d)  $y = -4/3x + 2$



e)  $y = 2x + 1$



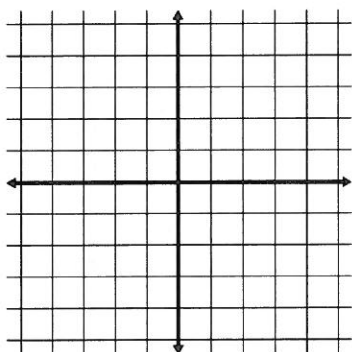
f)  $y = -1/3x + 2$



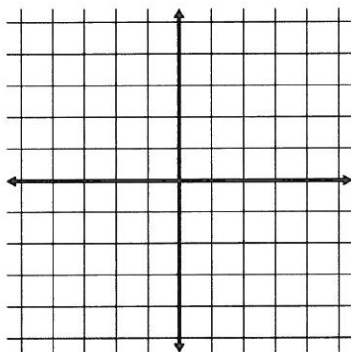
**II. Point-Slope Form**

Graph each of the following. Then calculate the x-intercept and y-intercept for each:

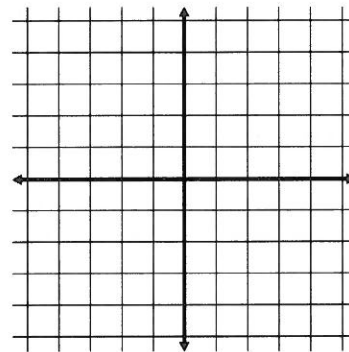
a)  $y = -(x + 4) + 2$



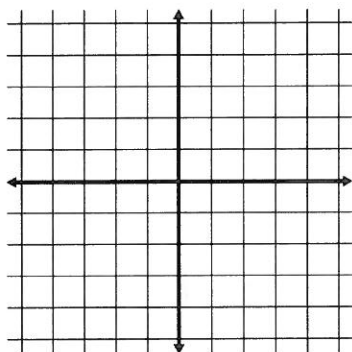
b)  $y = \frac{2}{3}(x) + 3$



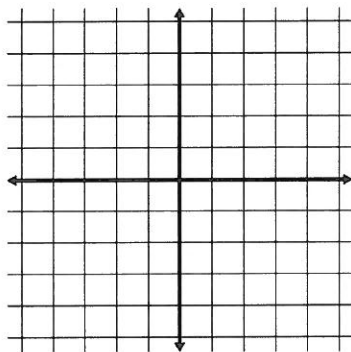
c)  $y = -\frac{3}{2}(x + 2)$



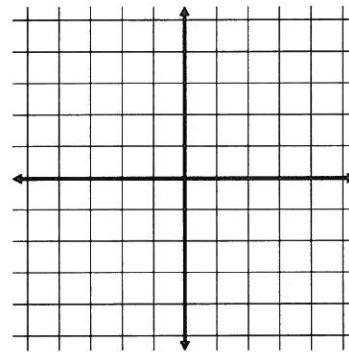
d)  $y = \frac{1}{3}(x - 1) - 3$



e)  $y + 2 = x + 4$

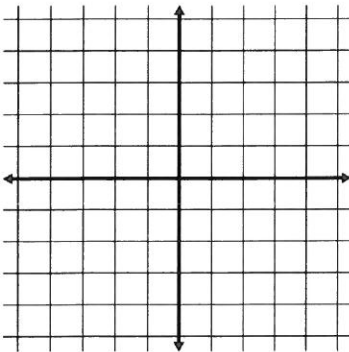


f)  $y = -\frac{2}{5}(x - 5)$

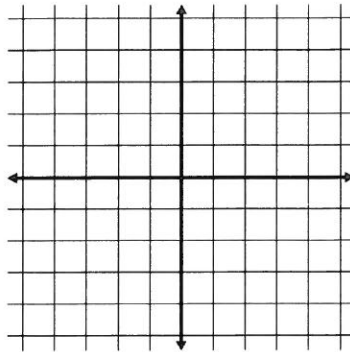


III. Standard Form:  
Graph each of the following. Then calculate the slope for each.

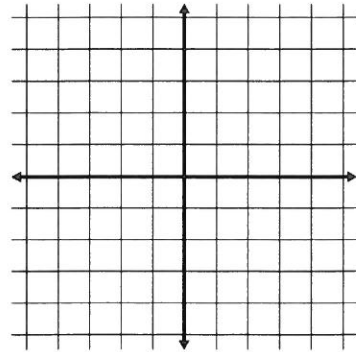
a)  $x + y = 2$



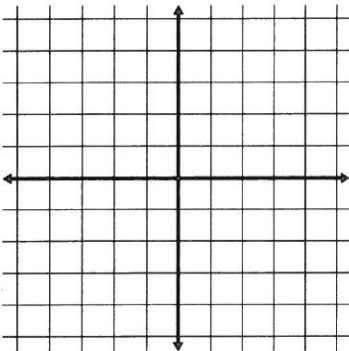
b)  $x - y = -4$



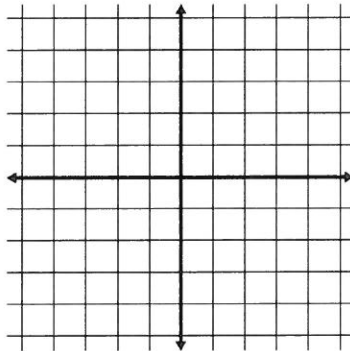
c)  $2x + 4y = 8$



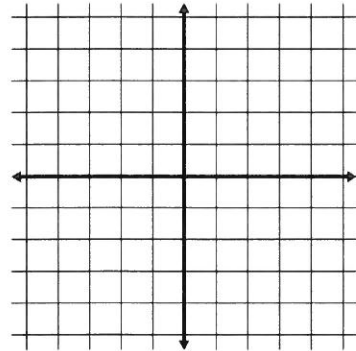
d)  $2x - 3y = 6$



e)  $x - 5y = -5$

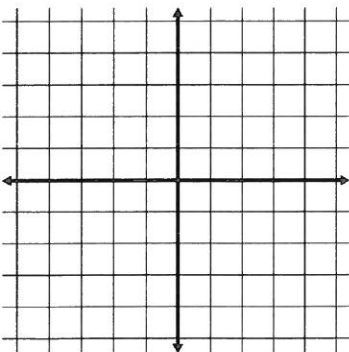


f)  $4x + 3y = -12$

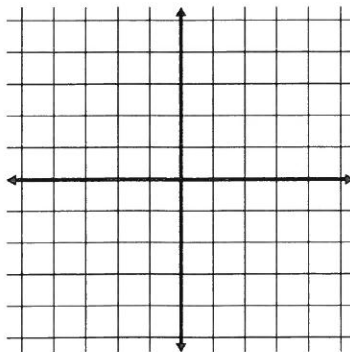


These are not as “pretty”.... But they can still be graphed using the same principle  
((just plot intercepts between the correct boxes))

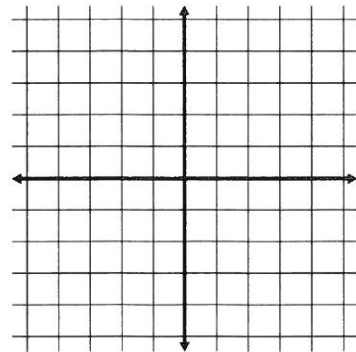
g)  $2x - 3y = 10$



h)  $6x - 2y = -3$



i)  $4x + 15y = 17$



## 2. Converting between forms – AND MAKING CONNECTIONS!! (Do all your work on a separate paper. )

Info	Point-Slope Form $y = m(x - h) + k$ ; $(h, k)$ is point	Slope-Intercept Form $y = mx + b$ ; $b$ is y-int	Standard Form $Ax + By = C$ ; $A \in \mathbb{N}, B \in \mathbb{Z}$
Ⓐ Slope: $\frac{3}{4}$ y-int: 2			
Ⓑ (4, -3) (-5, 1)			
Ⓒ	$y = \frac{3}{2}(x - 4) - 2$		
Ⓓ			$2x - 6y = 12$
Ⓔ		$y = 2x + 6$	
⓫ Slope: 0 (3, 5)			
⓬ (3, 7) (3, -2)			
⓭ Slope: -2 x-int: 4			

**3. Writing Equations from Scenarios:**

YOU MUST DEFINE YOUR VARIABLES OR YOUR FUNCTION WILL NOT MAKE SENSE!

**Slope Intercept Form:**

- a. You buy a cactus when it is 4 inches tall and it grows 1 in per year. Write a function that models the height of your cactus per year.
  
  
  
  
  
  
  
  
  
  
- b. Tony weighs 185 lbs and wants to lose 3 lbs every 2 weeks. Write a function that models how much Tony will weigh during the weeks of his diet.
  
  
  
  
  
  
  
  
  
  
- c. I open a bank account with \$2000 in and put in \$300 every 6 months. Write a function that models how much money you'll have each year.

**Point–Slope Form:**

- d. The temperature has been decreasing about 2 degrees every week and there is a prediction that in 5 weeks, it's going to be 51°
  
  
  
  
  
  
  
  
  
  
- e. Three weeks ago, I had 20 markers. I go through about 2 markers per week.
  
  
  
  
  
  
  
  
  
  
- f. When my cat was 9, she weighed 10 lbs. She is now 12 and weighs 12 lbs.

**Standard Form:**

- g. Your wallet contains \$100, but only in \$10 and \$5 bills. Write a function that models how many of each bill you could have in your wallet.
  
  
  
  
  
  
  
  
  
  
- h. You have to seat 150 guests at tables that can either fit 10 or 12 people. Write a function that models how many of each table you need.
  
  
  
  
  
  
  
  
  
  
- i. The Maroons scored 38 points by only scoring Touchdowns and Two–Point conversions. What function models how many of each they could have?

4. **Slope: Rate of Change...** it's  $\Delta y / \Delta x$  ... which is the same thing as the change in y per 1 unit of input!  
 Ex) If I'm going up 3, over 2, my slope is  $\frac{3}{2}$ ... which means y increases 3 units when x increases 2 units...  
 but also, it means that y increases 1.5 units when x increases 1 unit!

Find the slope (rate of change) the two points

- a. (4, 10) (6, 12)      c. (-3, 5) (6, 2)      e. (-6, 7) and (3, 4)      g. (7, -29) (-3, -4)  
 b. (3, 5) and (-1, 3)      d. (2, 5) (0, 5)      f. (3, 6) (-2, -2)      h. (4, -8) (4, 11)

Parallel lines: \_\_\_\_\_

Perpendicular Lines: \_\_\_\_\_

5. **Write all possible versions of the equations of the line with the given requirements.**  
**Then provide the x- and y-intercepts (if they exist)**

a) slope: 2, (4, 6)

b) slope  $\frac{3}{2}$ , (1, 5)

c) slope of zero, (4, -3)

d) Perpendicular to  $y = -2x + 6$   
 though (-4, -1)

b) (3, 6) (7, 2)

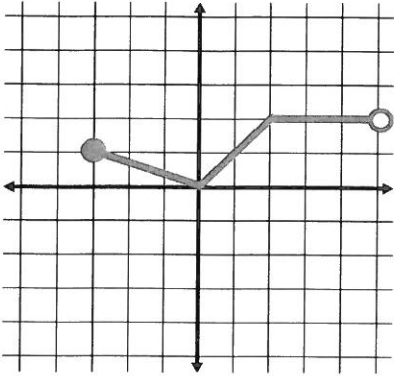
b) (-2, -6) (1, -4)

c) (-4, 5) (2, 5)

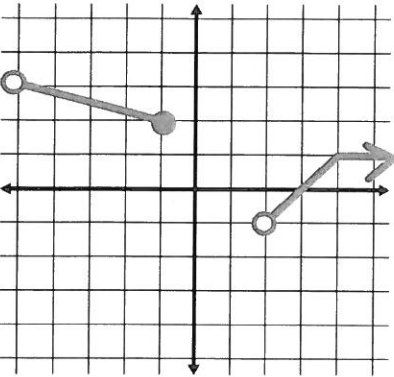
d) (-4, 6) (-4, 2)

6. Writing Piecewise Linear Functions (In class notes)

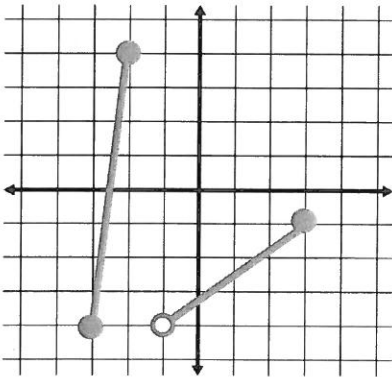
A.



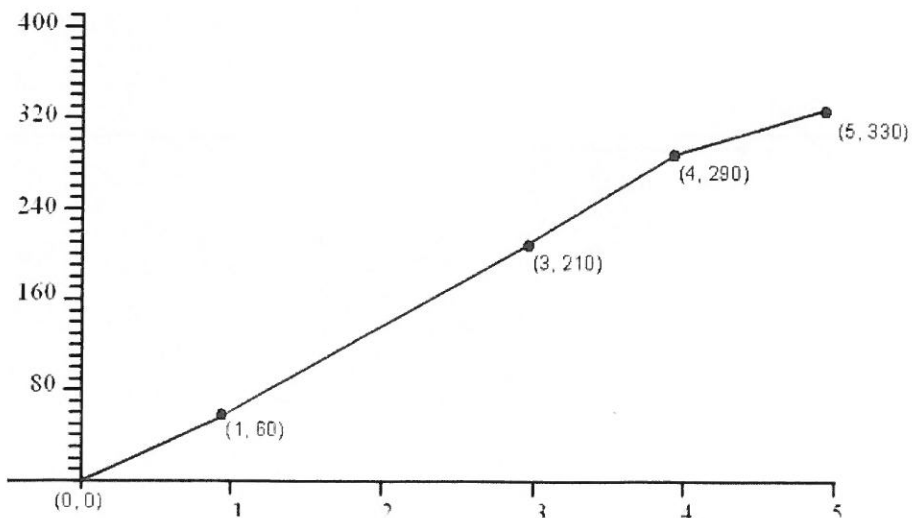
B.



C.

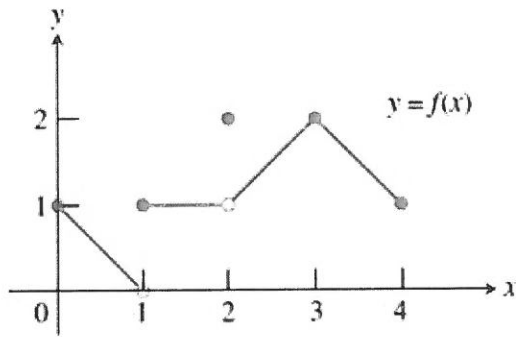


H.

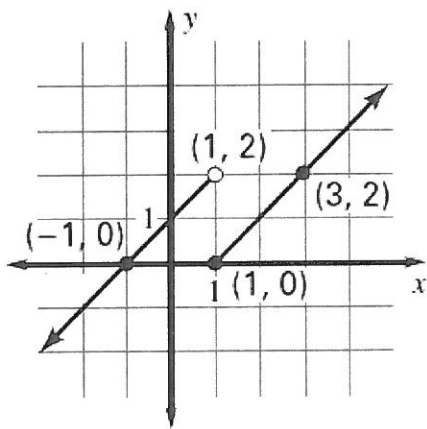


3. Writing Piecewise Linear Functions (In class notes)

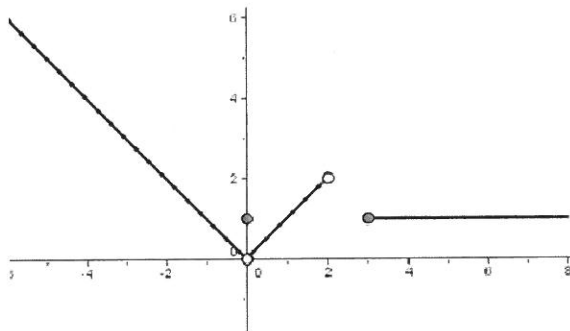
E.



F.



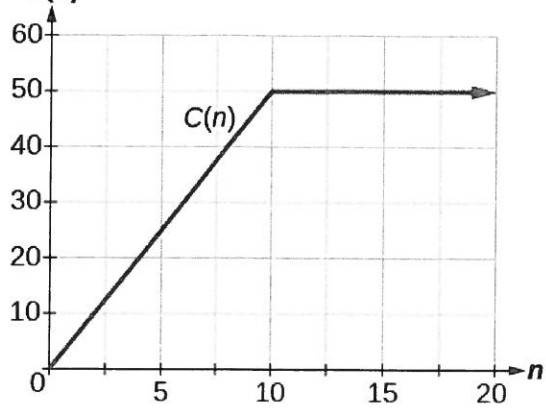
G.



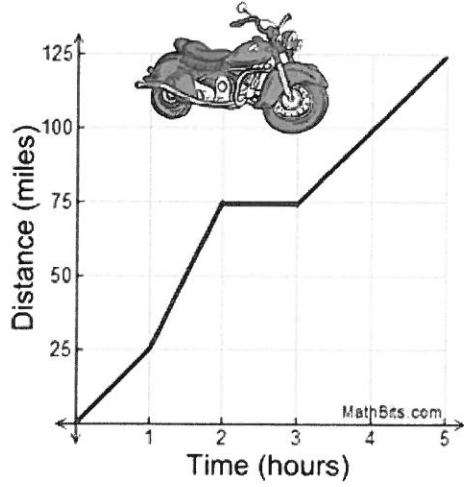


Using Piecewise Functions to tell a story & make predictions:

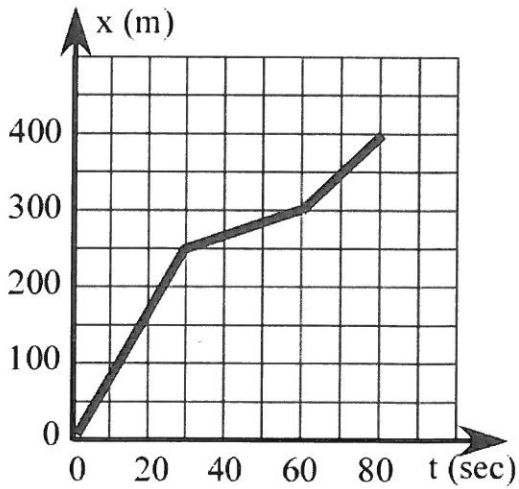
I.  $C(n)$



J.

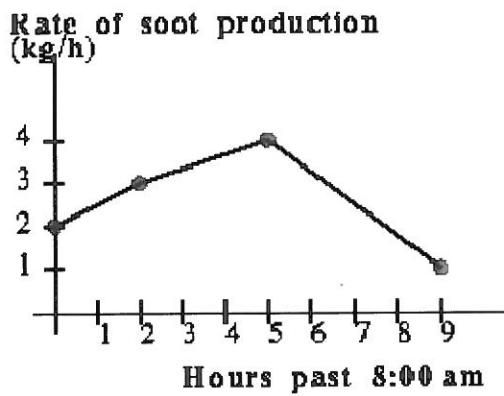


K.

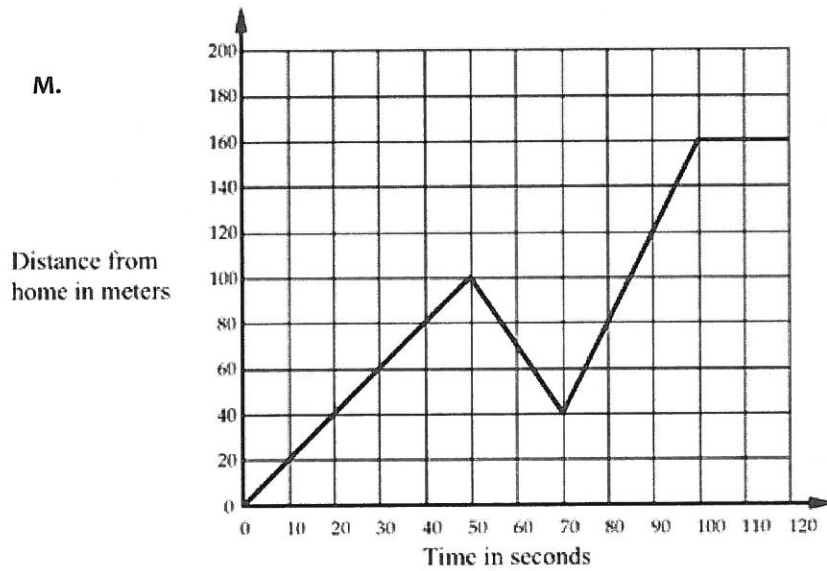


Using Piecewise Functions to tell a story & make predictions:

L.



M.



N.

