

# Review of Graphing and Writing Equations of Lines

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**The non-negotiables:**

$$y = mx + b$$

$$ax + by = c$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{\textit{rise}}{\textit{run}}$$

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

**Parallel lines have the same slope.**

**Perpendicular lines have opposite reciprocal slopes.**

**x-intercept: (a, 0)**

**y-intercept: (0, b)**

**Domain, input, x all describe the same values.**

**Range, output, y all describe the same values.**

**A function is a relationship in which all domain values have only one corresponding range value. (Vertical Line test)**

**When you write the equation of a line, you need two things: a point on the line and the slope of the line!**

**If you don't know these things, if you don't take the time to learn these things and learn them well, then you will not be able to be successful!**

**Concept 1: Domain, Range, and Determining if a Relation is a Function**

For each relation below, state the domain and the range and determine whether the relation is a function.

x		y
-2		4
-1		1
0		-2
1		-5
2		-8

x		y
-2		7
-1		6
0		10
1		12
-2		7

**Concept 2: Graphing Lines with a Table of Values**

1.  $y = 3x - 4$

x		y
-2		
-1		
0		
1		
2		

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

x		y
-2		
-1		
0		
1		
2		

3.  $y = -4x$

x		y
-2		
-1		
0		
1		
2		

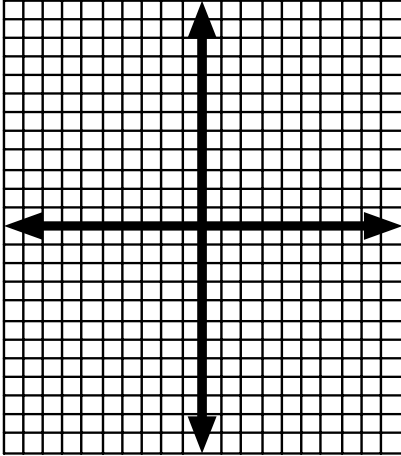
**Concept 3: Graphing Lines with Slope-intercept Form**

Identify the slope and y-intercept and then graph each line using the slope-intercept form of a line.

1.  $y = -2x + 6$

slope: \_\_\_\_\_

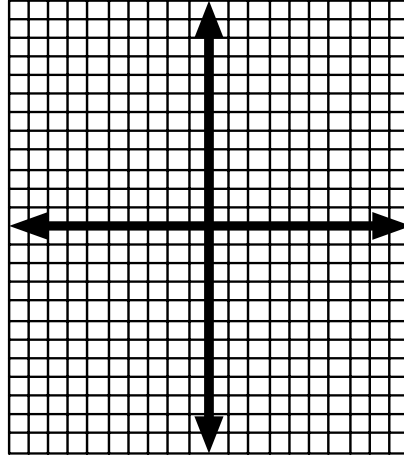
y-intercept: \_\_\_\_\_



2.  $y = 5x - 10$

slope: \_\_\_\_\_

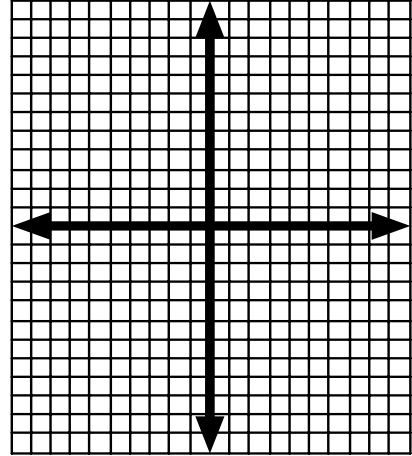
y-intercept: \_\_\_\_\_



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

slope: \_\_\_\_\_

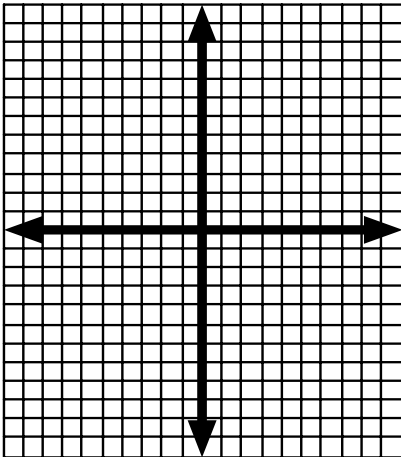
y-intercept: \_\_\_\_\_



4.  $y = \frac{-5}{4}x + 7$

slope: \_\_\_\_\_

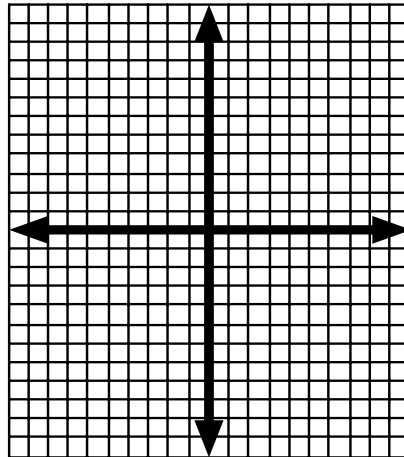
y-intercept: \_\_\_\_\_



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

slope: \_\_\_\_\_

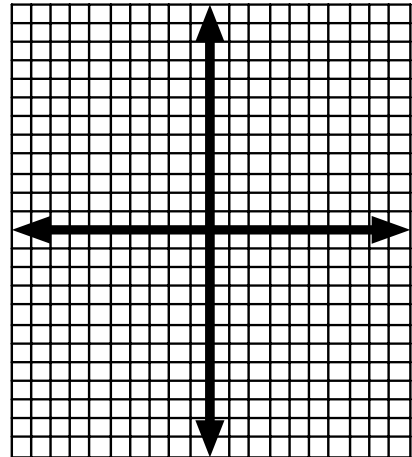
y-intercept: \_\_\_\_\_



6.  $y = -6x + 8$

slope: \_\_\_\_\_

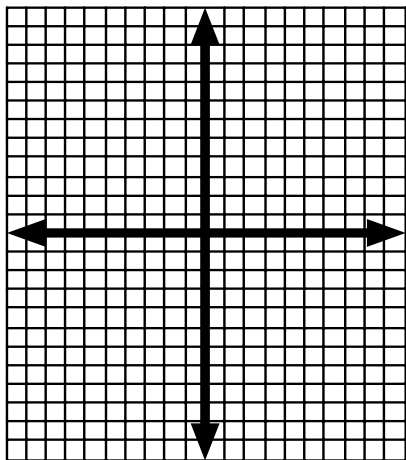
y-intercept: \_\_\_\_\_



$$7. y = \frac{-3}{7}x + 4$$

slope: \_\_\_\_\_

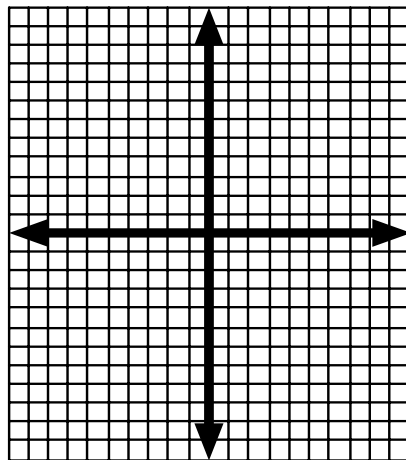
y-intercept: \_\_\_\_\_



$$8. y = -\frac{1}{4}x$$

slope: \_\_\_\_\_

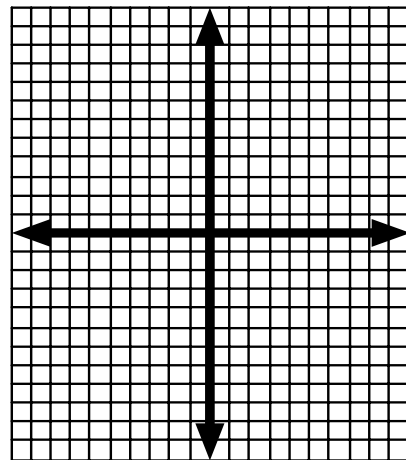
y-intercept: \_\_\_\_\_



$$9. y = 6x$$

slope: \_\_\_\_\_

y-intercept: \_\_\_\_\_



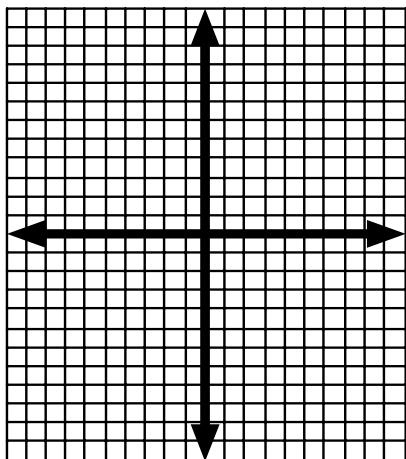
#### **Concept 4: Graphing Lines with Point-slope Form**

Identify the slope and y-intercept and then graph each line using the slope-intercept form of a line.

$$1. y = -2(x - 4) + 6$$

slope: \_\_\_\_\_

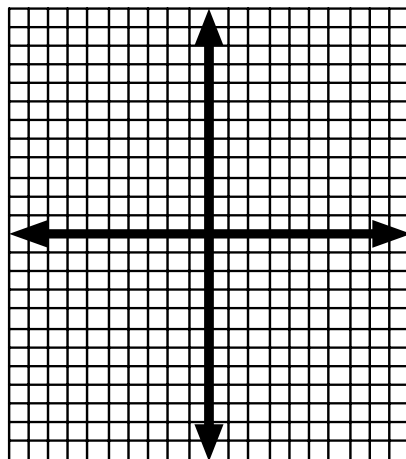
point: \_\_\_\_\_



$$2. y = 5(x + 3) - 10$$

slope: \_\_\_\_\_

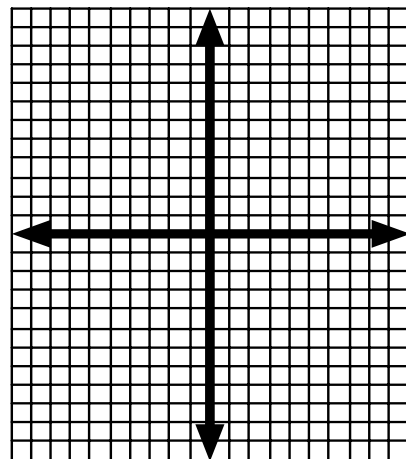
point: \_\_\_\_\_



$$3. y = \frac{2}{3}(x + 6) + 1$$

slope: \_\_\_\_\_

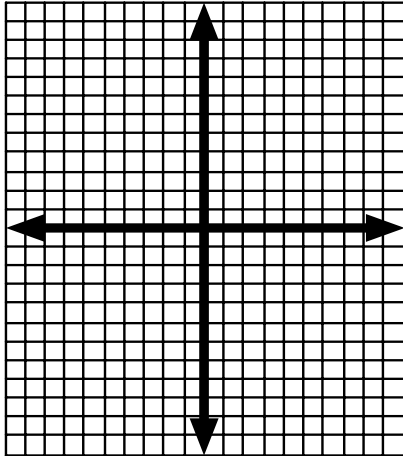
point: \_\_\_\_\_



$$4. y = \frac{-5}{4}(x-5) - 2$$

slope: \_\_\_\_\_

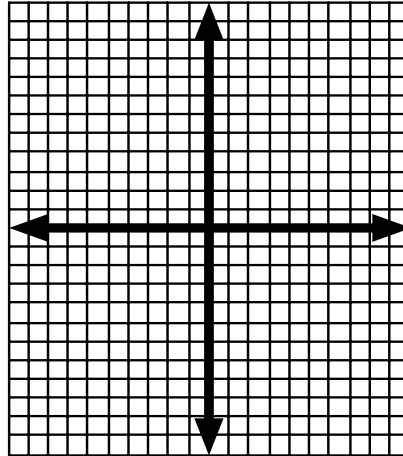
point: \_\_\_\_\_



$$5. y = -\frac{2}{5}(x-1) + 7$$

slope: \_\_\_\_\_

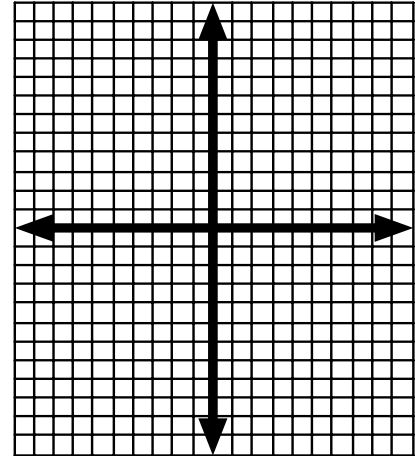
point: \_\_\_\_\_



$$6. y = -6(x+6) - 3$$

slope: \_\_\_\_\_

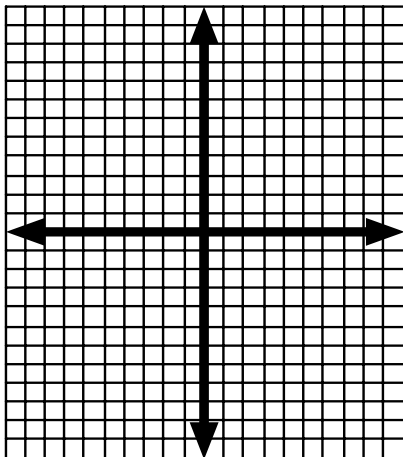
point: \_\_\_\_\_



$$7. y = \frac{-3}{7}(x+3) - 5$$

slope: \_\_\_\_\_

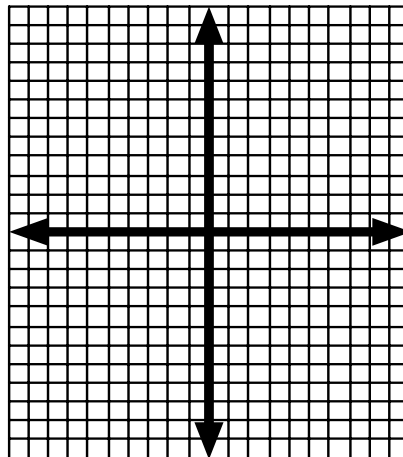
point: \_\_\_\_\_



$$8. y = -\frac{1}{4}(x-5) + 7$$

slope: \_\_\_\_\_

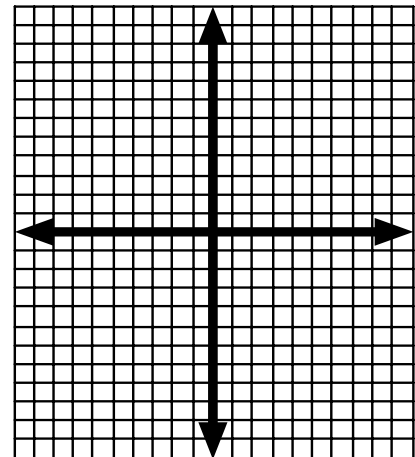
point: \_\_\_\_\_



$$9. y = 3(x+2) - 6$$

slope: \_\_\_\_\_

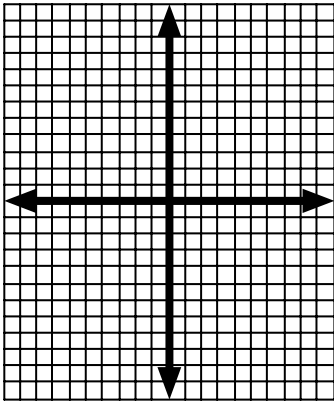
point: \_\_\_\_\_



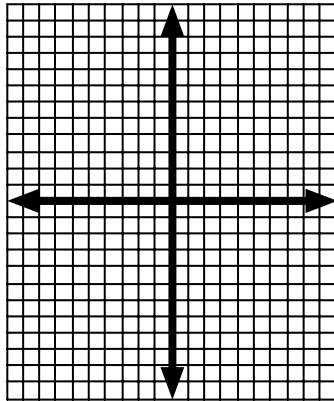
**Concept 5: Graphing Horizontal and Vertical Lines**

Graph each line below.

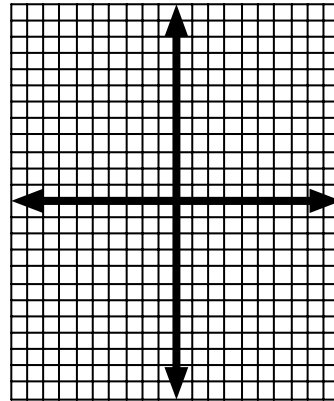
1.  $x = -1$



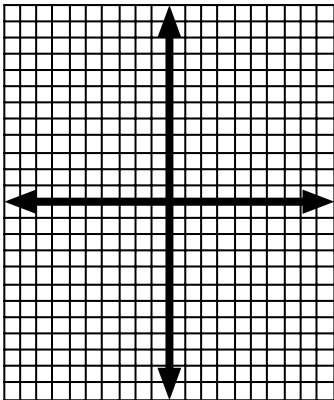
2.  $x = 7$



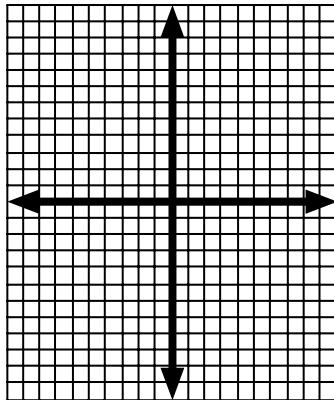
3.  $x = 1$



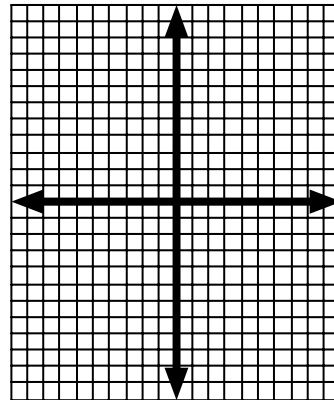
4.  $y = -7$



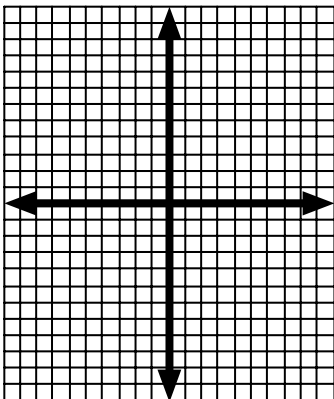
5.  $y = 5$



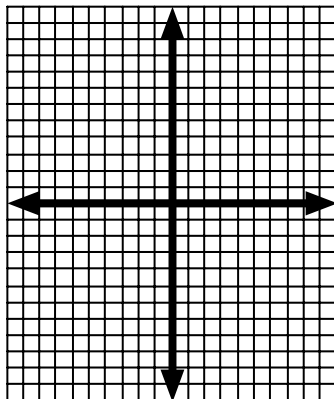
6.  $y = 8$



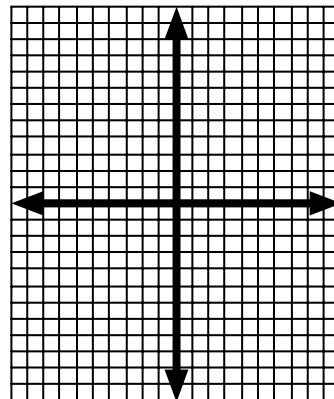
7.  $x = -3$



8.  $y = -2$



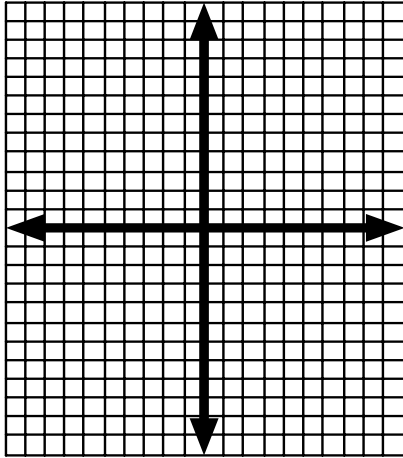
9.  $x = 4$



**Concept 6: Graphing Lines and Finding Points of Intersection**

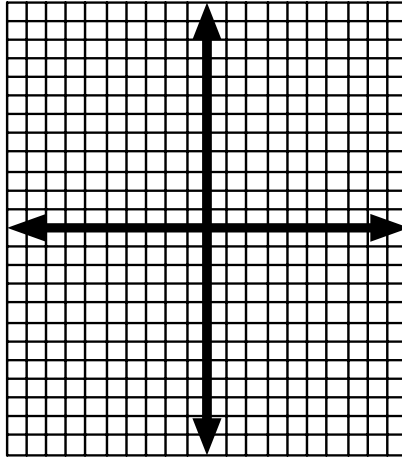
Graph each pair of lines and identify the point of intersection.

1.  $x = 4$   
 $y = 4$



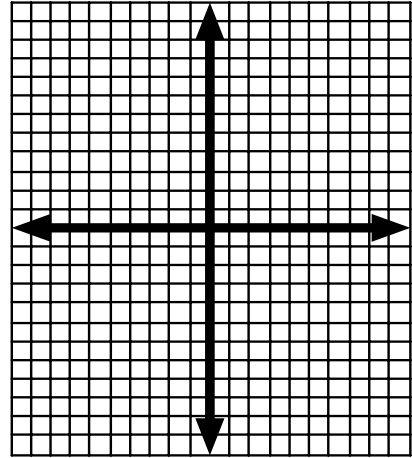
Point of Intersection: \_\_\_\_\_

2.  $x = 6$   
 $y = 4$



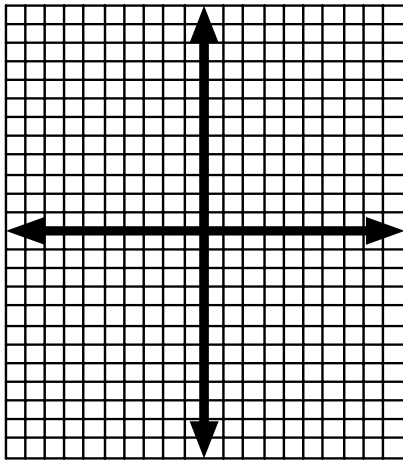
Point of Intersection: \_\_\_\_\_

3.  $y = -9$   
 $y = 2$



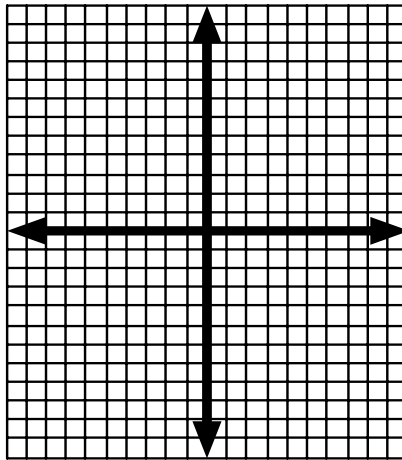
Point of Intersection: \_\_\_\_\_

4.  $y = 2x + 1$   
 $y = -2x + 9$



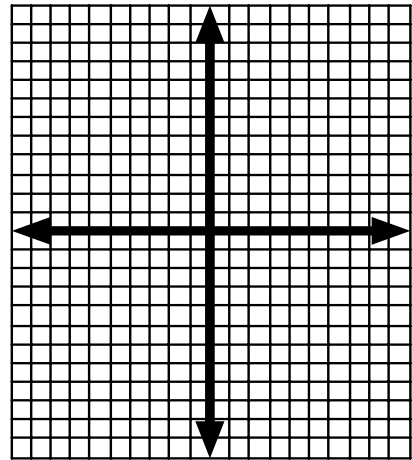
Point of Intersection: \_\_\_\_\_

5.  $y = -4/3(x - 4) + 8$   
 $y = -4/3x + 3$



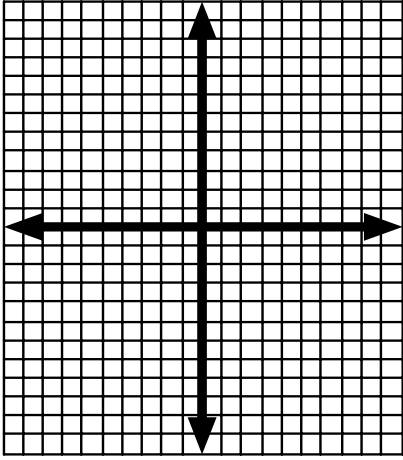
Point of Intersection: \_\_\_\_\_

6.  $y = 4/5(x + 2) - 5$   
 $y = -1/3x$



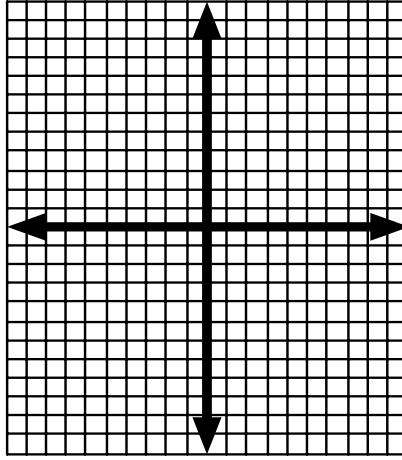
Point of Intersection: \_\_\_\_\_

$$7. \begin{aligned} y &= -5/6(x + 4) + 4 \\ y &= x - 3 \end{aligned}$$



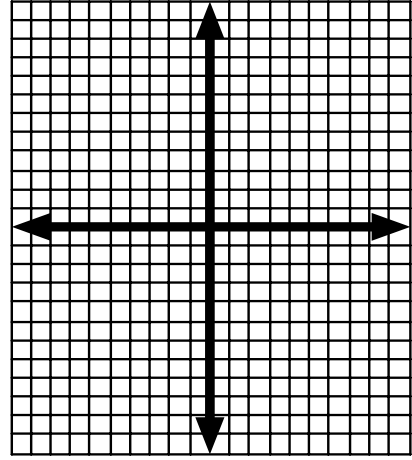
Point of Intersection: \_\_\_\_\_

$$8. \begin{aligned} y &= 7/2(x - 2) - 6 \\ x &= 2 \end{aligned}$$



Point of Intersection: \_\_\_\_\_

$$9. \begin{aligned} y &= -5x + 7 \\ y &= 7 \end{aligned}$$



Point of Intersection: \_\_\_\_\_

**Concept 7: Solving for Standard Form**

Solve for y so that each equation is in Standard Form.

1.  $4x - 6y = 36$

2.  $-5x - 3y = 15$

3.  $7x + 4y = -28$

4.  $-3(8x - 24y) = -72$

5.  $-9(2x + 3y) = -54$

**Concept 8: Lines and x-intercepts, y-intercepts**

Solve for the x-intercept and y-intercept of each line and then use the intercepts to graph the line.

1.  $y = -2x + 6$

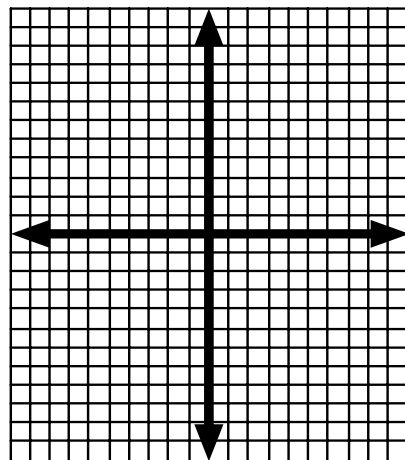
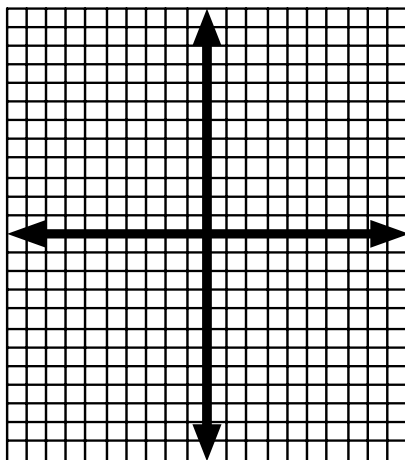
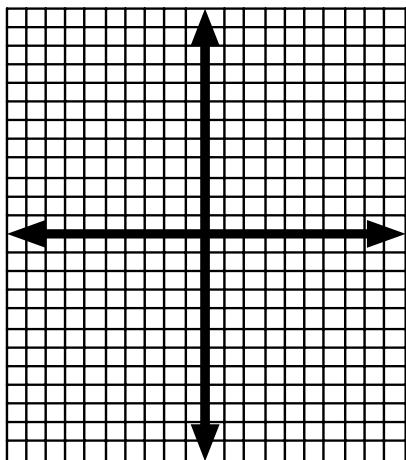
x-int: \_\_\_\_\_ y-int: \_\_\_\_\_

2.  $y = 5x - 10$

x-int: \_\_\_\_\_ y-int: \_\_\_\_\_

3.  $7x + 4y = -28$

x-int: \_\_\_\_\_ y-int: \_\_\_\_\_



4.  $4x - 6y = 36$

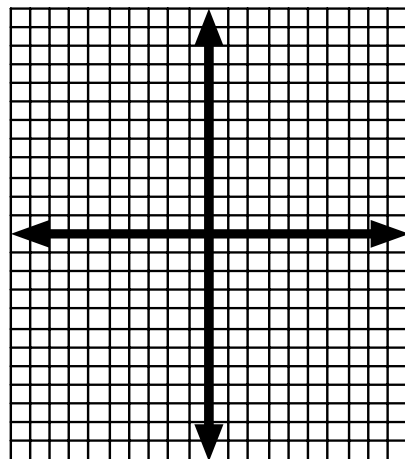
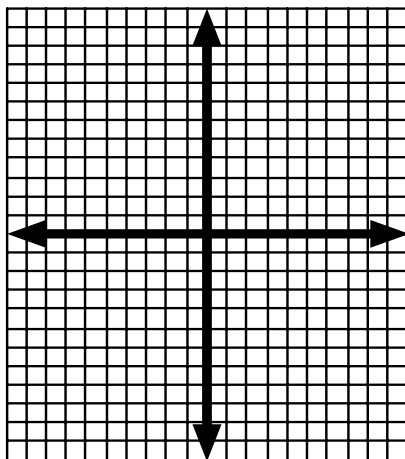
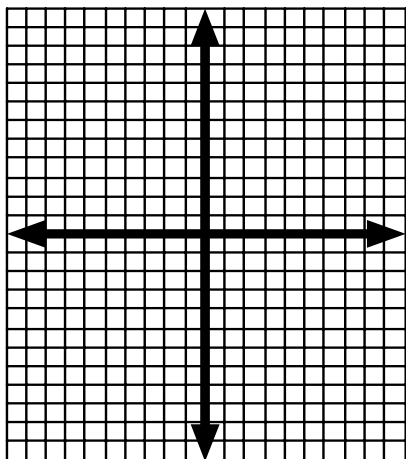
x-int: \_\_\_\_\_ y-int: \_\_\_\_\_

5.  $-5x - 3y = 30$

x-int: \_\_\_\_\_ y-int: \_\_\_\_\_

6.  $-2(12x + 4y) = -60$

x-int: \_\_\_\_\_ y-int: \_\_\_\_\_



**Concept 9: Writing Equations of Lines**

Write the equation of the line through using the given information

1.  $m = \frac{3}{4}$  (3, 5)

2.  $m = -\frac{7}{8}$  (-8, 1)

3.  $m = 5$  (9, -2)

4. (-3, 10) and (-6, 4)

5. (-2, -12) and (-4, -8)

6. (6, 6) and (10, 12)

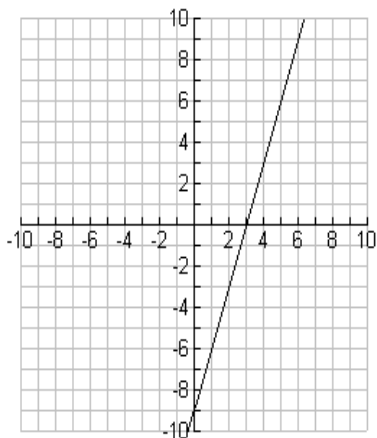
7. (-8, 0) and (0, 4)

8. (-1, 9) and (-4, 2)

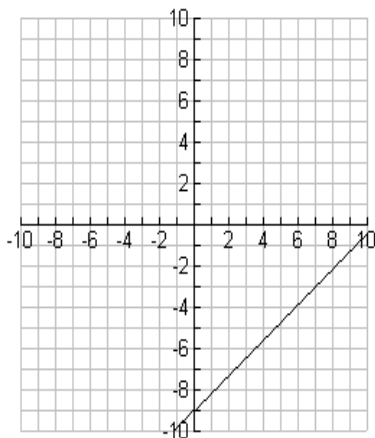
9. (7, -12) and (3, -4)

Write the equation of the line graphed below.

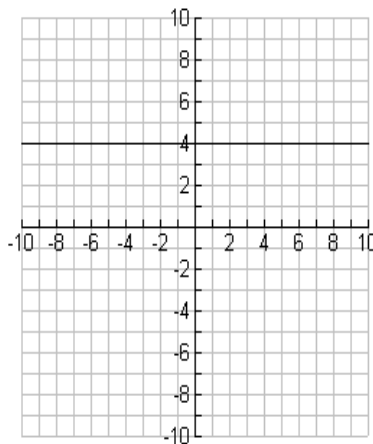
10.



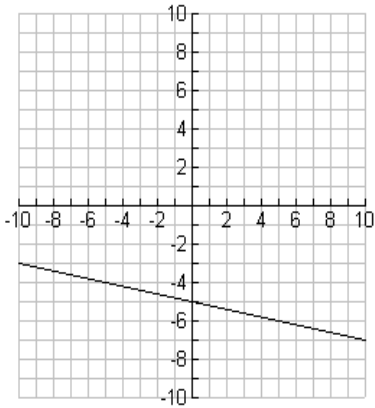
11.



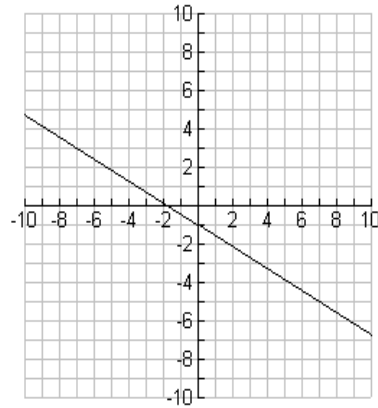
12.



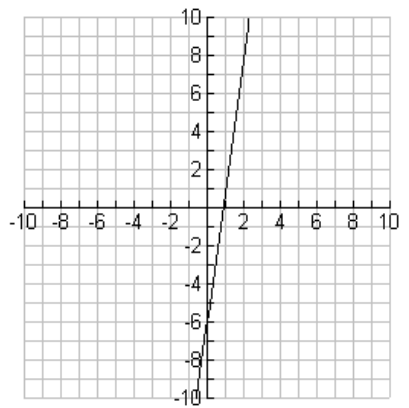
13.



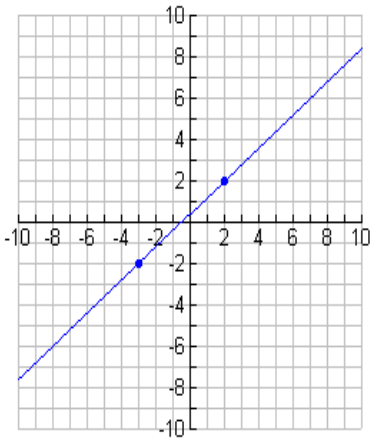
14.



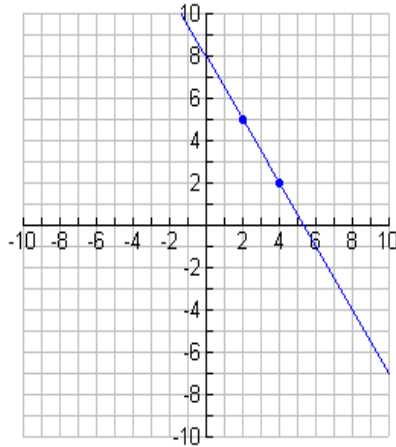
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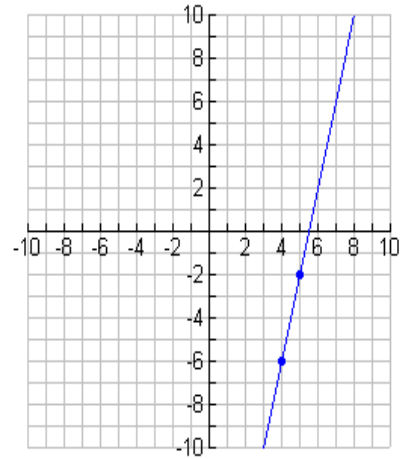
16.



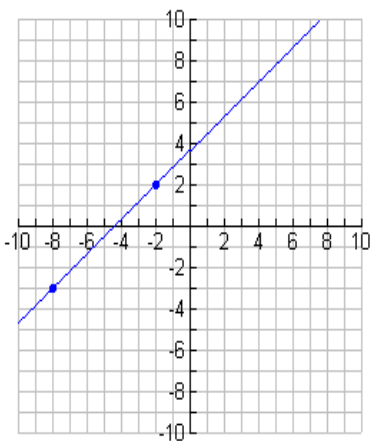
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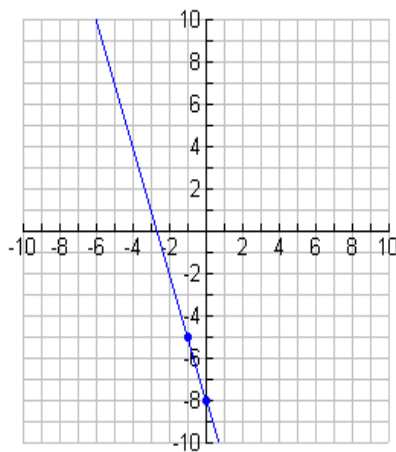
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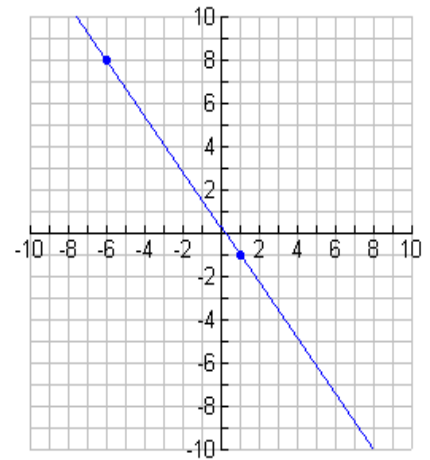
19.



20.



21.



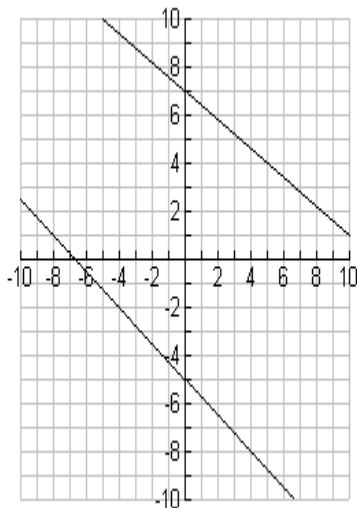
### Concept 10: Parallel Lines

Determine if the following pairs of lines are parallel.

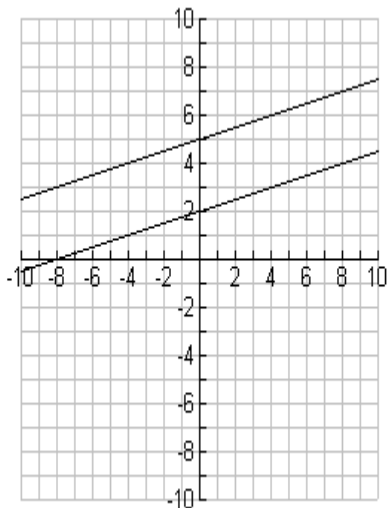
1.  $y = -5x + 3$       2.  $y = \frac{4}{3}x - 1$       3.  $y = 3$       4.  $5x + 7y = -35$       5.  $-8x + 16y = 32$
- $y = 2x - 6$        $y = \frac{4}{3}x + 6$        $y = 2$        $-10x - 14y = 28$        $24x - 48y = 144$

Determine if the following lines are parallel based on the graphs below.

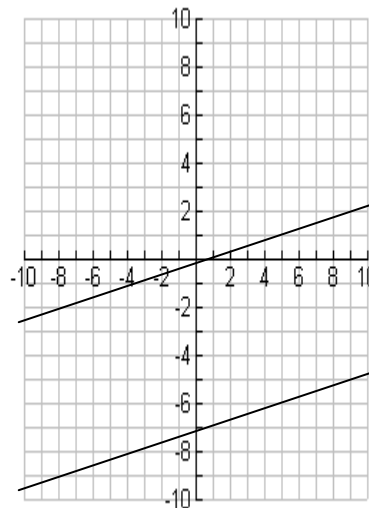
6.



7.

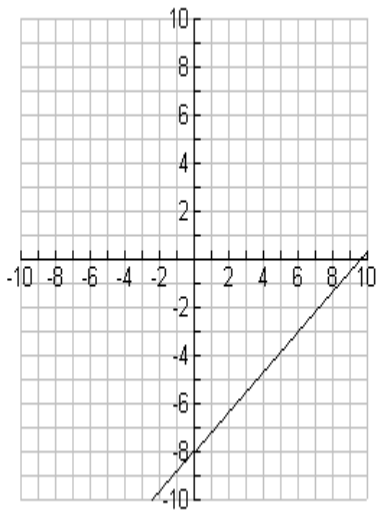


8.

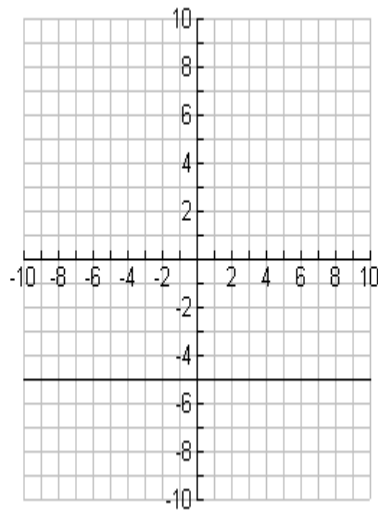


Given the graph of a line, draw a line parallel to the given line through the given point.

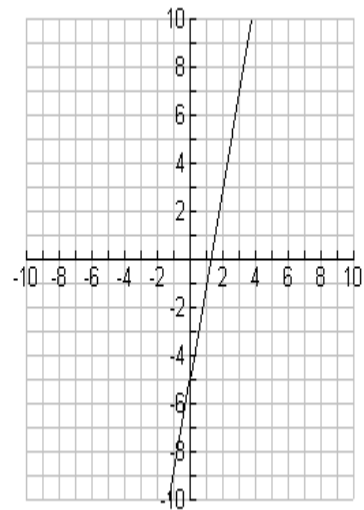
9.



10.



11.



**Concept 11: Writing Equations of Parallel Lines**

Write the equation of the line parallel to the given line and through the given point.

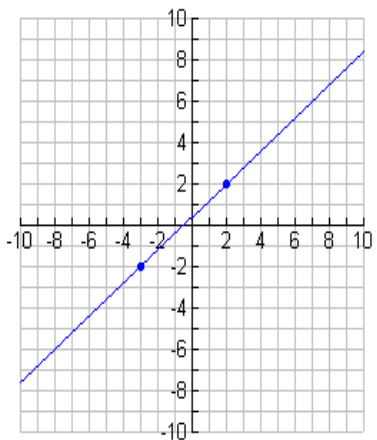
1.  $y = 4/5x + 9$   $(-2, 7)$

2.  $y = 7/8(x - 3) + 1$   $(4, 8)$

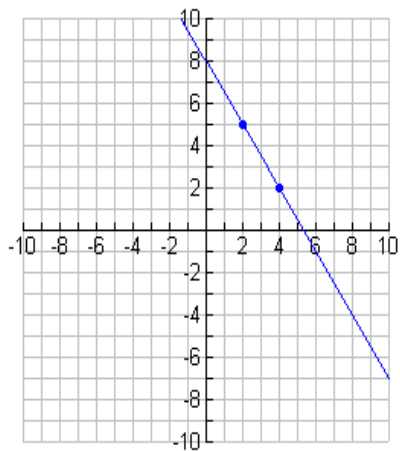
3.  $y = 4x - 6$   $(-8, -11)$

Write the equation of the line parallel to the line graphed below and through the indicated point.

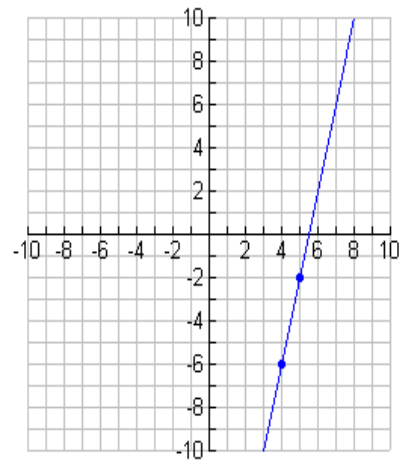
4.



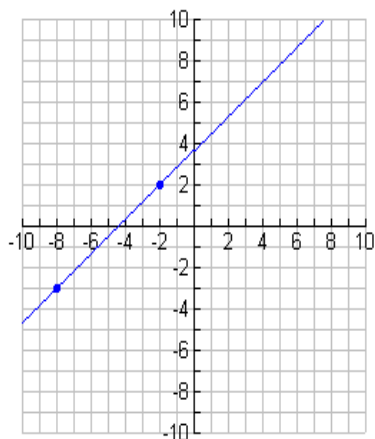
5.



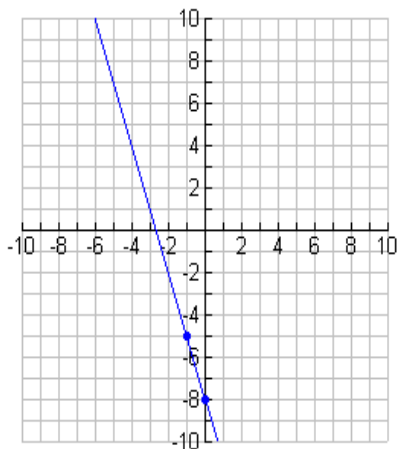
6.



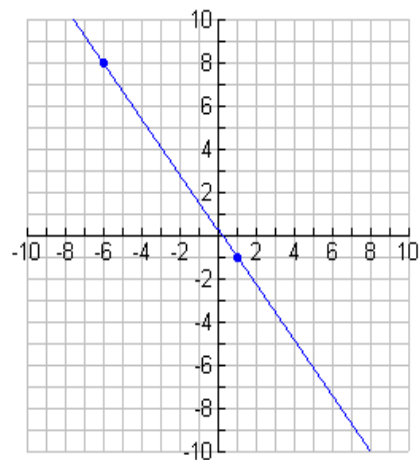
7.



8.



9.



### **Concept 12: Perpendicular Lines**

Determine if the following pairs of lines are perpendicular.

1.  $y = -5x + 3$

2.  $y = \frac{4}{3}x - 1$

3.  $x = 4$

4.  $-9x + 7y = 63$

5.  $3x + 5y = -30$

$y = \frac{1}{5}x - 6$

$y = \frac{-3}{4}x + 6$

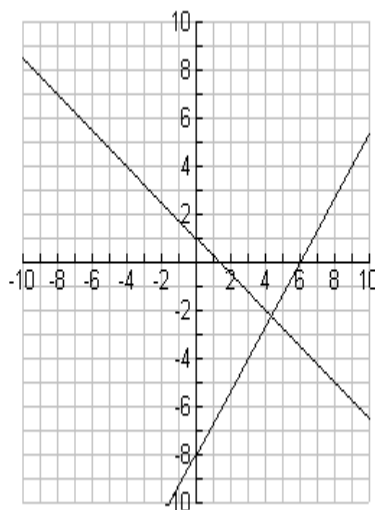
$y = -5$

$7y + 9x = -45$

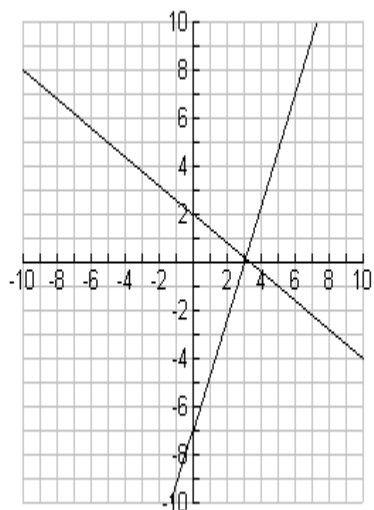
$-10x + 6y = -120$

Determine if the following lines are perpendicular based on the graphs below.

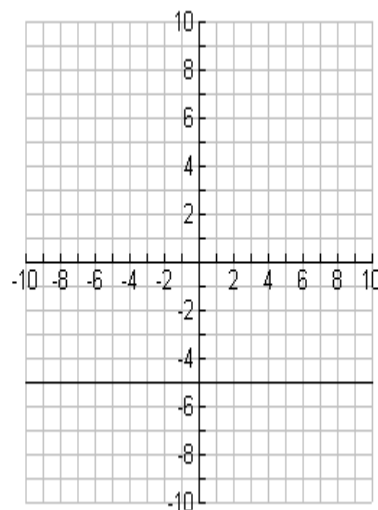
6.



7.

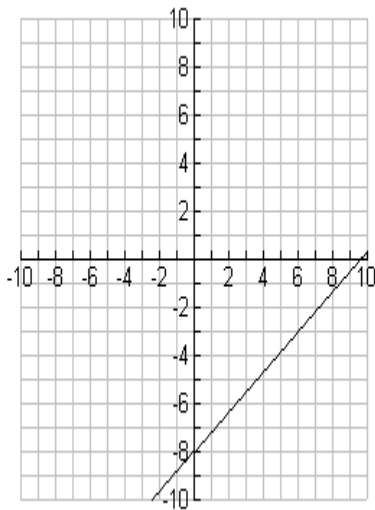


8.

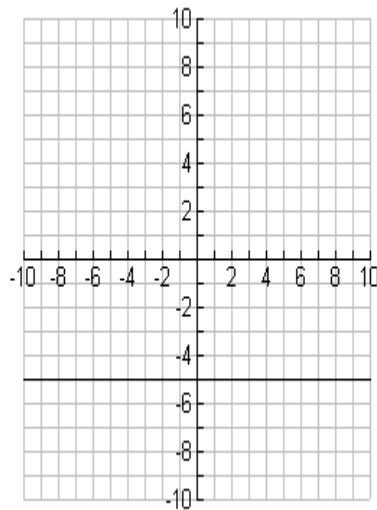


Given the graph of a line, draw a line perpendicular to the given line through the given point.

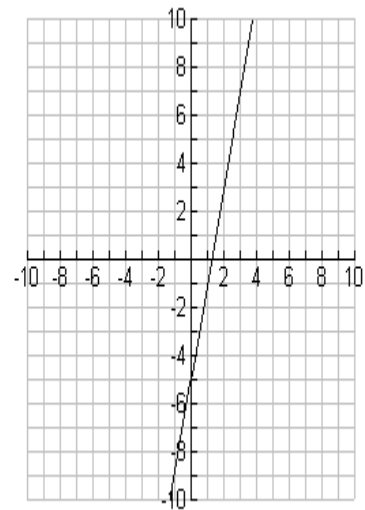
9.



10.



11.



**Concept 13: Writing Equations of Perpendicular Lines**

Write the equation of the line perpendicular to the given line and through the given point.

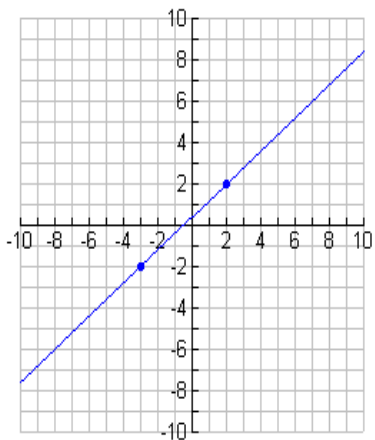
1.  $y = 4/5x + 9$   $(-2, 7)$

2.  $y = 7/8(x - 3) + 1$   $(4, 8)$

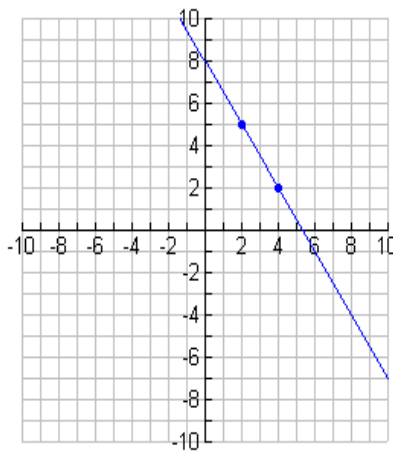
3.  $y = 4x - 6$   $(-8, -11)$

Write the equation of the line perpendicular to the line graphed below and through the indicated point.

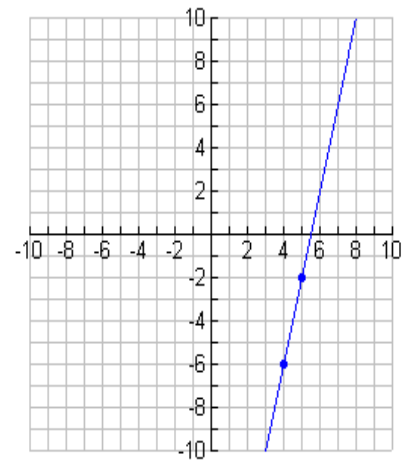
4.



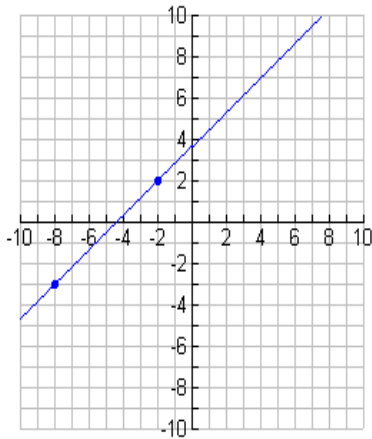
5.



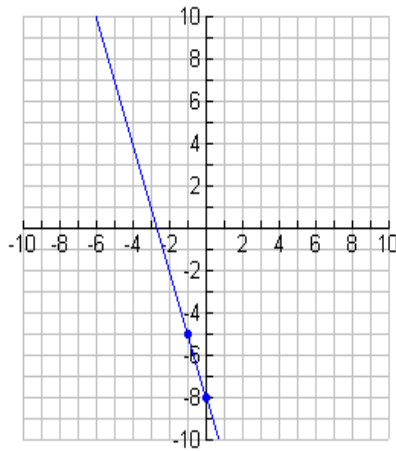
6.



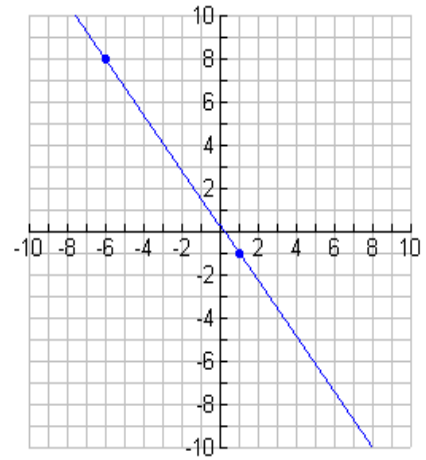
7.



8.

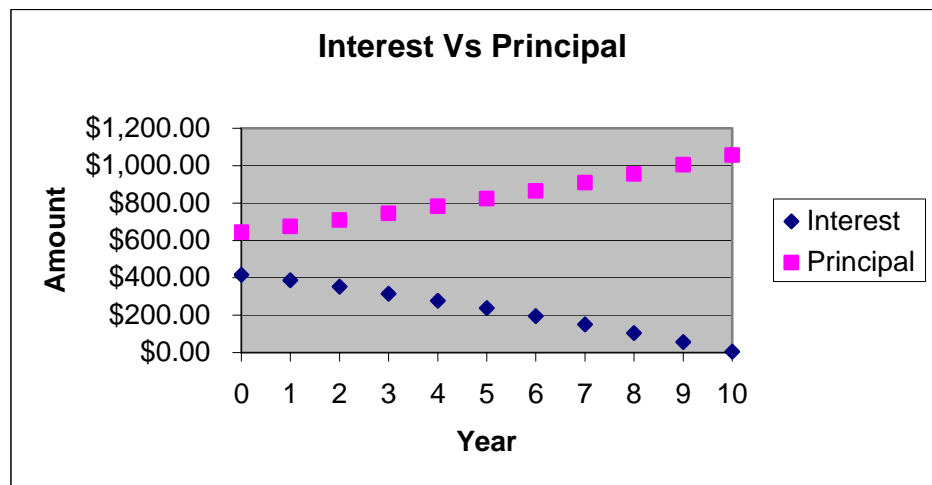


9.



**Concept 14: Lines in Context**

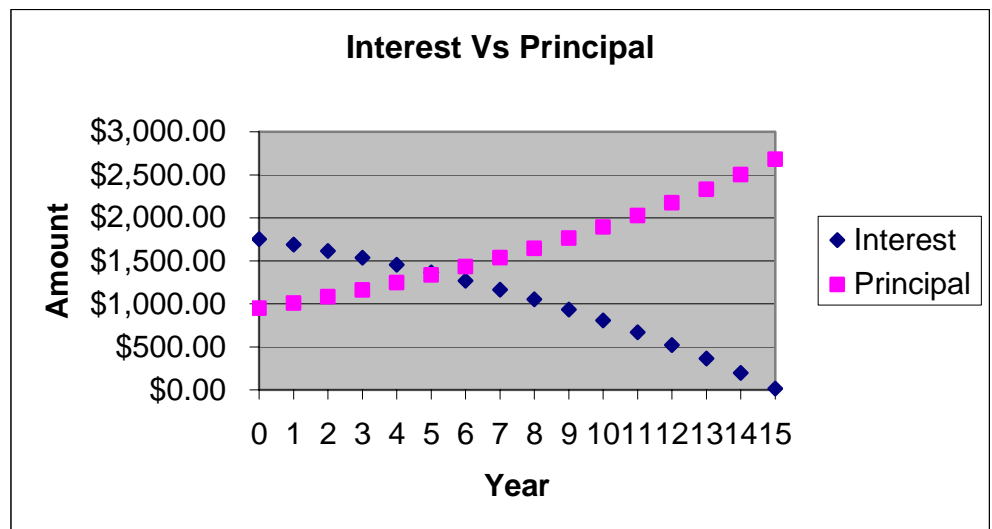
- The table and graph below represent the interest versus principal in a monthly payment on a 10-year \$100,000 loan with 5% interest rate.



- Add the interest and principal for year 3. What does this result represent?
- Add the interest and principal for year 6. Is it the same as the result in a?
- What does the y-intercept for both sets of data represent?

- d. Select two points and write a line of best fit for the interest data.
  
- e. What does the slope of your line represent?
  
- f. Circle the x-intercept of this line on the graph above. Use you line of best fit to find this value.
  
- g. What does this tell us about the interest in the last payment? Does this make sense?
  
- h. Select two points and write a line of best fit for the principal data.
  
- i. What does the slope of your line represent?

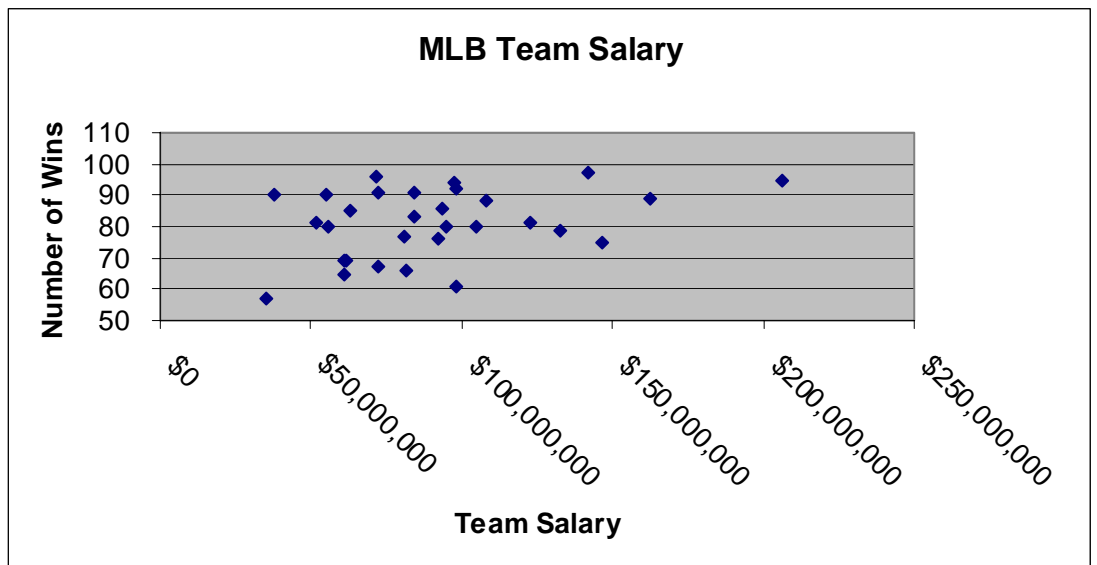
2. The table and graph below represent the interest versus principal in a monthly payment on a 15-year \$300,000 loan with 7% interest rate.



- a. Find the total monthly payment for the loan using the table above.
- b. What does the y-intercept for each line represent for the loan?
- c. What does the x-intercept for the interest data represent?
- d. Select two points and write a line of best fit for the interest data.
- e. What does the slope of this line represent?
- f. Select two points and write a line of best fit for the principal data.
- g. What does the slope of this line represent?
- h. Circle on the graph above where the two sets of data appear to cross.
- i. Find the exact point of intersection of the data.

- j. What does this point of intersection tell you about your payment in regards to the amount of interest and principal?

3. The table below represents the salary and the number of wins for all MLB teams.



- a. Select two points from the data set above and write a line of best fit.
- b. If a team spends \$80,000,000, predict the number of wins they should expect based on your line of best fit.
- c. If a team spends \$150,000,000, predict the number of wins they should expect based on your line of best fit.

d. If a team wants to win 105 games, how much should they spend?

e. The St. Louis Cardinals spent \$93,540,000 this year. If they increase their payroll to \$115,000,000, how many wins should they expect?

Year	Interest	Principal
0	\$416.67	\$643.99
1	\$386.53	\$674.13
2	\$352.04	\$708.62
3	\$315.78	\$744.87
4	\$277.68	\$782.98
5	\$237.62	\$823.04
6	\$195.51	\$865.15
7	\$151.25	\$909.41
8	\$104.72	\$955.94
9	\$55.81	\$1,004.84
10	\$4.40	\$1,056.25

Year	Interest	Principal
0	\$1,750.00	\$946.48
1	\$1,687.46	\$1,009.02
2	\$1,614.52	\$1,081.96
3	\$1,536.31	\$1,160.18
4	\$1,452.44	\$1,244.05
5	\$1,362.51	\$1,333.98
6	\$1,266.07	\$1,430.41
7	\$1,162.67	\$1,533.82
8	\$1,051.79	\$1,644.70
9	\$932.89	\$1,763.59
10	\$805.40	\$1,891.08
11	\$668.70	\$2,027.79
12	\$522.11	\$2,174.38
13	\$364.92	\$2,331.56
14	\$196.37	\$2,500.11
15	\$15.64	\$2,680.85

Team Salary	Number of Wins
\$206,333,389	95
\$162,747,333	89
\$146,859,000	75
\$141,927,381	97
\$132,701,445	79
\$122,864,929	81
\$108,273,197	88
\$105,013,667	80
\$98,376,667	61
\$97,828,833	92
\$97,559,167	94
\$94,945,517	80
\$93,540,753	86
\$92,355,500	76
\$84,423,667	91
\$84,227,000	83
\$81,612,500	66
\$81,108,279	77
\$72,386,544	91
\$72,267,710	67
\$71,923,471	96
\$62,689,357	85
\$61,425,000	69
\$61,203,967	69
\$60,718,167	65
\$55,641,500	80
\$55,250,545	90
\$51,654,900	81
\$37,799,300	90
\$34,943,000	57