

1. For each of the following fractions find the simplest form.

a.  $\frac{5}{25}$

b.  $\frac{18}{54}$

c.  $\frac{62}{93}$

2. Compute and write in simplest form (no decimals).

a.  $\frac{10}{3} \times \frac{21}{20}$

b.  $\frac{22}{3} \div \frac{55}{24}$

c.  $\frac{10}{3} + \frac{3}{7}$

d.  $\frac{5}{12} - \frac{1}{15}$

3. Simplify the following.

a.  $\frac{24}{-8}$

b.  $\frac{-63}{-7}$

c.  $\frac{22}{0}$

d.  $\frac{0}{3}$

4. Use exponential notation to rewrite the expression.

a.  $(-10)(-10)(-10)$

b.  $(10)(10)(10)(10)$

5. Write each expression in expanded form **and** then evaluate.

a.  $2^4$

b.  $-2^4$

c.  $(2)^4$

d.  $(-2)^4$

e.  $(2)^3$

f.  $(-2)^3$

6. Use the Order of Operations to simplify. Show all work. No decimals.

a.  $-9 + 17$

b.  $-\frac{9}{4} - \frac{5}{6}$

c.  $-17 - 4 - (-3) + 8 - 2$

d.  $\frac{1}{2}(43 - 11 - (-2)) + 14 \div 7$

e.  $\frac{5}{2} + \left(-\frac{4}{3}\right) \div \frac{24}{5}$

f.  $\left(-\frac{4}{27}\right)\left(-\frac{18}{15}\right) - \frac{1}{3}$

7. Simplify.

a.  $\frac{4^5}{4^7}$

b.  $\frac{(-5)^2}{-5^2}$

c.  $3(2 + 2)^3 - 42$

d.  $\left[-2 - 7 + (5 - 12)^2\right] \div 5 - 2$

8. An **Expression** is a \_\_\_\_\_ .

Identify whether the following is an expression or not.

a.  $25 - \div 5$

b.  $25 \div (-5)$

c.  $3x + 6 = 12$

9. Below is a list of words.

Circle the words that relate to the mathematical operation “ + ”.

Box the words that relate to the mathematical operation “ - ”.

Cross out the words that relate to the mathematical operation “  $\times$  ”.

Draw a line through the words that relate to the mathematical operation “  $\div$  ”.

Less than	double	quotient	sum	subtract
Multiply	per	increased by	times	minus
Divide	add	of	plus	product
Difference	more than	less	triple	ratio

10. Rewrite the following word expressions into an algebraic expression.

Word Expression	Algebraic Expression
The sum of the lengths of three sides of a triangle divided by 2.	
Eighty more dollars than triple the cost of a chair.	
Fifteen dollars less than the original price.	
The sum of a number and 7	
The quotient when 3 less than some number is divided by 3 more than some other number	
The sum of two consecutive integers	
If $x$ feet are cut off from a board that is 23 ft long, express how much of the board is left	

1. The perimeter of a rectangle with length  $L$  and width  $W$  is given by the equation,  $P = 2L + 2W$ . Find the **perimeter** of the rectangles given the following lengths and widths. Show all work and include proper units.

a.  $L = 12$  cm and  $W = 5.3$  cm

$$P = 2L + 2W$$

b.  $L = 6$  inches and  $W = 7$  inches

$$P = 2L + 2W$$

2. A car lease costs \$2,800 down and \$310 per month for  $n$  months.

- a. Write an expression that represents the total cost for  $n$  months of leasing the car.

$$C = \underline{\hspace{2cm}}$$

- b. Use your expression from part a. to find how much to lease the car for 60 months. Interpret your result with a complete sentence.

3. Evaluate the following expressions if  $x = 3$ ,  $y = -5$ , and  $z = 1$ . Show all work.

a.  $x + y$

b.  $xy - z$

c.  $x - yz$

d.  $\frac{-2x - 3y}{2z}$

e.  $2y - x + z^2$

f.  $(4x + 3y)^2$

4. Simplify the following expressions. Show all work.

a.  $4x^2 + 5x^2 + 3x - 7x$

b.  $4x^2 + 5x^2 - (3x - 7x)$

c.  $5d^2 - 6c - 7d^2 + 10c$

d.  $5d^2 - 6c - (7d^2 + 10c)$

e.  $5 - 2(7x + 10)$

f.  $(5 - 2)(7x + 10)$

g. Add  $3b + 2$  and  $5b + 10$

h. Subtract  $3b + 2$  from  $5b + 10$

5. A triangle has a side with length of  $x$  inches. The second side is 4 times as long as the first. The third side is 150 inches shorter than the first. Draw a picture of the situation and find a simplified expression for the perimeter.

1. Solve each equation showing all your work. Circle your solution.

a.  $x + 4 = 9$

d.  $x - 7 = -3$

b.  $3 - 2x = 5 - x$

e.  $4(3x + 4) = 11x - 2$

c.  $5(5x + 3) = 3(8x - 2) + 4$

f.  $3 - (3x - 5) = 8 - 2x$

2. Define the variable, set up an equation, solve the equation and answer the question with a complete sentence.

You have saved \$498 to purchase a new washing machine that costs \$1349.

How much more must you save? Let  $x$  represent the unknown.

Let  $x =$  \_\_\_\_\_

3. Solve each equation showing all your work. Circle your solution.

a.  $4x = 8$

d.  $-3x = 24$

b.  $\frac{7x}{8} = -21$

e.  $14x - 5x = 36$

c.  $-11 = -\frac{x}{5}$

f.  $\frac{4}{5}x = 10$

4. Translate each statement into an equation. Let  $x$  represent the number in each case.

a. A number divided by 5 is -4.

b.  $\frac{3}{4}$  of a number is 18.

5. Define the variable, set up an equation, solve it and answer the question with a complete sentence.

At Grace Elementary School, we have found that on average  $\frac{3}{4}$  of the students ride the bus to school. If 570 students ride the bus, how many students attend the school?

Let  $x =$  \_\_\_\_\_

1. Solve each equation and show all work. Circle your answers.

a.  $3x - 1 = 17$

b.  $5 - 4x = 25$

c.  $5(3x + 4) = 10(x + 2)$

d.  $3(6x - 1) = 2(5x + 2)$

e.  $2(3 - 5x) + 7x = 6x - 21$

f.  $15 = \frac{5}{9}(x - 32)$



2. Applications: Define the variable, write an equation, solve the equation and interpret your results with a complete sentence.

a. The sum of twice a number and 4 is 20. Find the number.

b. Find two consecutive odd integers such that 3 times the first integer is 5 more than twice the second integer.

c. Carla bought a total of 60 stamps in 41¢ and 2¢ denominations. If she paid \$16.80, how many of each type of stamp did she purchase?

Activity #5 (Solving Inequalities)  
Math 60

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

1. Solve each inequality showing all work **and** graph the solution set on a number line.

a.  $x + 3 > -2$

b.  $4x \geq -12$

c.  $-\frac{x}{3} \geq 2$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

d.  $\frac{2}{7}x - 5 < -9 - \frac{5}{7}x$

e.  $8x - (6 + 3x) \geq 4(x - 2)$

f.  $4x - 2 < 7x + 16$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

g.  $-2(3 + 4x) \geq 4x - 30$

h.  $7x + 3 < 5(x + 1)$

i.  $5x + 2 \geq 3(x + 4)$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Write the proper inequality for each statement.

a.  $x$  is positive

c.  $x$  is no more than  $-4$

b.  $x$  is nonnegative

d.  $x$  is at least  $25$

3. Applications: Define the variable, write an inequality, solve the inequality, and interpret your results with a complete sentence

a. Cassie has \$175 to purchase two identical skirts, a sweater and a pair of shoes. If the sweater costs \$50 and the shoes cost \$45 how much does she have to spend on each skirt?

b. Tim's grade in Biology is based on three 100 point exams and one 200 point final. He must earn 70% of the total points to receive a C in the course. Currently his test scores are 63, 72 and 70. What must he earn on the 200 point final to receive a C in the course?

Activity #6 (Formulas)  
Math 60

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

1. Solve each formula for the variable indicated.

a.  $d = rt$  for  $t$

b.  $V = \frac{KT}{P}$  for  $T$

c.  $y = mx + b$  for  $b$

d.  $y = mx + b$  for  $m$

e.  $C = \frac{5}{9}(F - 32)$  for  $F$

f.  $A = \frac{1}{2}h(B + b)$  for  $b$

g.  $B = P(1 + rt)$ , for  $t$

h.  $D = \frac{C - s}{n}$ , for  $s$

2. Applications. **Define** your variable (by completing the chart) , **write** the equation, **solve** the equation and **interpret** your results with a complete sentence.

- a. At noon a jogger leaves one point, running 8 mi/hr. One hour later a bicyclist leaves the same point, traveling 20 mi/hr in the opposite direction. At what time will they be 36 miles apart?

	Distance	=	(Rate)	·	(Time)
Jogger					
Bicyclist					

Sentence: \_\_\_\_\_

- b. With the wind behind it, a plane made a flight between two towns in 2 hr. Returning against the wind, the plane flew 60 mph slower. The return flight took 3 hr. What was the plane's speed in each direction?

	Distance	=	(Rate)	·	(Time)
Going Trip					
Returning Trip					

Sentence: \_\_\_\_\_

1. List the elements of each set using the roster method.

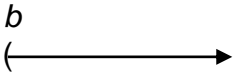
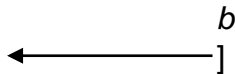
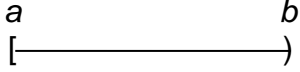
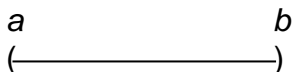
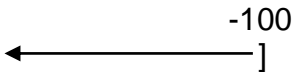
	List using the Roster Method
The set of factors of 60	
The set of positive multiples of 6	
The set of integers between 3 and 9, inclusive	

2. Use set-builder notation to describe each set. Graph each set on a number line.

	Set Builder Notation	Number Line
The set of real numbers less than 2		
The set of real numbers between 1 and 5, inclusive		
The set of real numbers greater than or equal to 27		

3. Use set-builder notation, interval notation **and** a number line to describe the following sets.

	Set Builder Notation	Interval Notation	Number Line
The set of real numbers greater than or equal to -3.7 and less than 14.8			
The set of real numbers less than -205			

Basic Set Notation (where $a$ and $b$ represent any real numbers)			
Set	Set-Builder Notation	Interval Notation	Graph
All real numbers greater than $b$	$\{x   x > b\}$	$(b, \infty)$	$b$ 
All real numbers less than or equal to $b$	$\{x   x \leq b\}$	$(-\infty, b]$	$b$ 
All real numbers greater than or equal to $a$ and less than $b$	$\{x   a \leq x < b\}$	$[a, b)$	$a$ <span style="float: right;"><math>b</math></span> 
All real numbers greater than $a$ and less than $b$	$\{x   a < x < b\}$	$(a, b)$	$a$ <span style="float: right;"><math>b</math></span> 
All real numbers less than or equal to 4			
All real numbers that are greater than 15.25			
		$(-15, -1)$	
			$-100$ 
	$\{x   -9 \leq x < 20\}$		
		$(12, \infty)$	
	$\{x   x < 205\}$		

1. Complete each ordered pair so that it is a solution for the given equation. Show your work.

a.  $5x - y = 15$

(     , 0 )

( 2,     )

( 4,     )

b.  $y = 3x - 4$

( 0,     )

(     , 0 )

(  $\frac{5}{3}$ ,     )

c.  $y = 3x + 9$

(     , 0 )

( 0,     )

(  $-\frac{2}{3}$ ,     )

2. Find two solutions (ordered pairs) for each equation (answers are not unique). If you wish to use your graphing calculator, then list three solutions (ordered pairs)

a.  $4x - 2y = 8$

b.  $x + 3y = 12$

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

d.  $x = \frac{1}{2}$



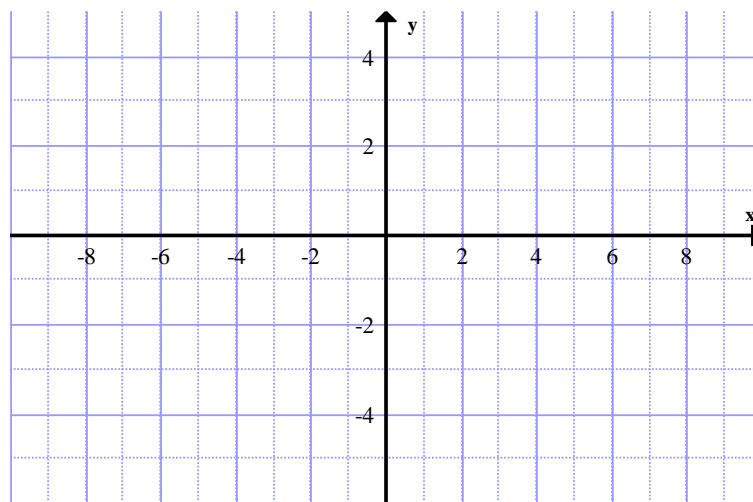
3. The Tea-Totaler specializes in fancy Tea drinks. When  $x$  iced teas are sold, the Revenue is  $R = 3.25x$  dollars and the Cost is  $C = 0.75x + 30$  dollars.
- a. Algebraically find a simplified equation for the Profit. Profit = Revenue – Cost. Make sure you get this right. The rest of the problems depend on a correct answer to this one.
- b. **Use** the profit equation you found in part a. to find the profit associated with selling 10 iced teas (show the process of substitution). **State** your answer as an ordered pair. Using both  $x$  and  $y$  coordinates, **interpret** the ordered pair with a complete sentence.
- c. **Use** the profit equation you found in part a. to find the profit associated with selling 40 iced teas (show the process of substitution). **State** your answer as an ordered pair. Using both  $x$  and  $y$  coordinates, **interpret** the ordered pair with a complete sentence.
- d. Algebraically determine how many iced teas need to be sold in order for the profit to be zero. **State** your answer as an ordered pair. Using both  $x$  and  $y$  coordinates, **interpret** the ordered pair with a complete sentence.
- e. Algebraically determine how many iced teas need to be sold in order for the profit to be \$370. **State** your answer as an ordered pair. Using both  $x$  and  $y$  coordinates, **interpret** the ordered pair with a complete sentence.

1. Give the Quadrant in which each point is located or the axis on which the point lies.

- a.  $(-6, 2)$
- b.  $(7, 1)$
- c.  $(0, 3)$
- d.  $(-9, -1)$
- e.  $(6, -4)$
- f.  $(-3, 1)$

2. Plot each point on the grid below. Connect the line segments to make a famous constellation.

- a.  $(-9, 1)$
- b.  $(-6, 2)$
- c.  $(-3, 1)$
- d.  $(0, 0)$
- e.  $(1, -4)$
- f.  $(6, -4)$
- g.  $(7, 1)$



3. State the domain and range of each relation and then tell whether the relation is a function of  $x$ . If the relation is NOT a function, explain why.

Relation	Domain	Range	function of $x$ ?												
The set of ordered pairs $\{(0,1),(1,1),(2,1),(3,1)\}$															
The set of ordered pairs $\{(4,0),(-4,1),(-4,4),(1,4)\}$															
<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td><math>x</math></td> <td><math>y</math></td> </tr> <tr> <td>8</td> <td>9</td> </tr> <tr> <td>4</td> <td>5</td> </tr> <tr> <td>5</td> <td>4</td> </tr> <tr> <td>2</td> <td>3</td> </tr> <tr> <td>-3</td> <td>2</td> </tr> </table>	$x$	$y$	8	9	4	5	5	4	2	3	-3	2			
$x$	$y$														
8	9														
4	5														
5	4														
2	3														
-3	2														

4. Given the function  $f(x) = x^2 - 3x + 7$ , find:

a.  $f(2)$

b.  $f(-2)$

c.  $f(10)$

d.  $f(-10)$

e.  $f(a)$

f.  $f(\Delta)$

5. The number of accidents in 1 month involving drivers  $x$  years of age can be approximated by the function  $f(x) = 2x^2 - 125x + 3000$ .

a. Use the function to find the number of accidents in 1 month that involved 17 years-olds and interpret your results with a complete sentence.

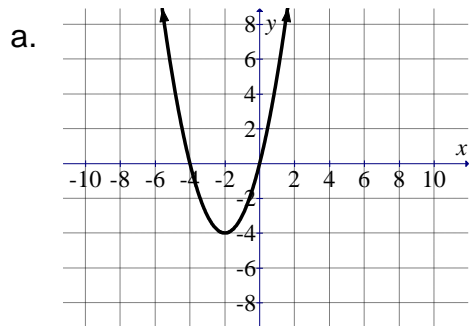
b. Use the function to find the number of accidents in 1 month that involved 26 years-olds and interpret your results with a complete sentence.

6. Suppose that the weight, in pounds, of a baby boy  $x$  months old is predicted, for his first 10 months, by the function  $f(x) = 1.5x + 8.3$ .

a. Use the function to find the predicted weight at the age of 4 months and interpret your results with a complete sentence.

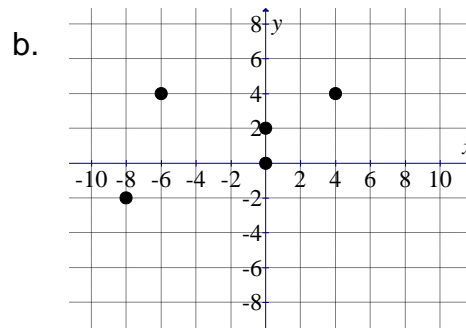
b. Use the function to find the predicted age of a baby boy weighing 20.3 pounds and interpret your results with a complete sentence.

1. Determine whether each relation is a function or is not a function.  
Then state its domain (D) and its range (R).



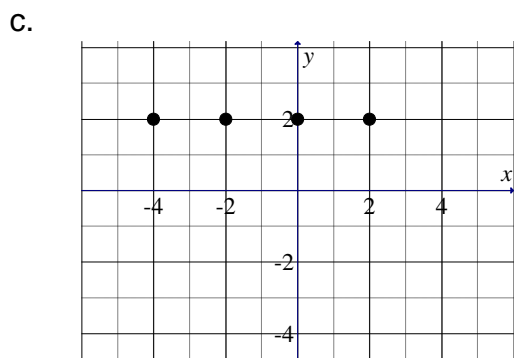
Function? **Yes** or **No**

D: \_\_\_\_\_ R: \_\_\_\_\_



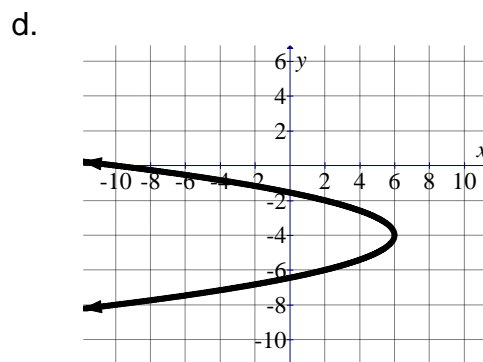
Function? **Yes** or **No**

D: \_\_\_\_\_ R: \_\_\_\_\_



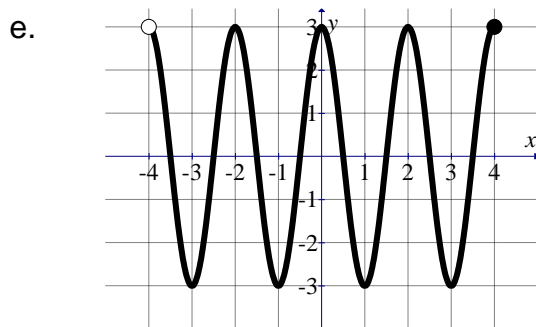
Function? **Yes** or **No**

D: \_\_\_\_\_ R: \_\_\_\_\_



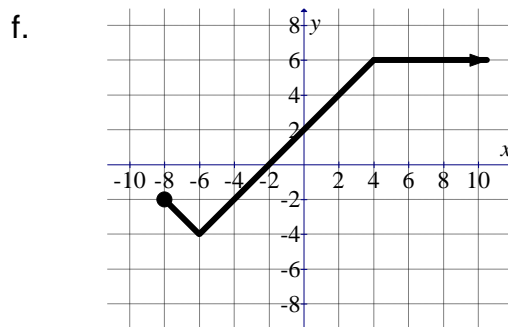
Function? **Yes** or **No**

D: \_\_\_\_\_ R: \_\_\_\_\_



Function? **Yes** or **No**

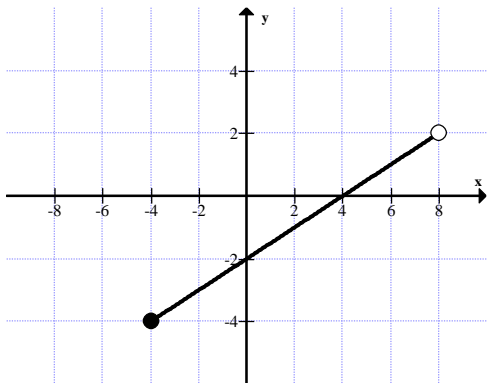
D: \_\_\_\_\_ R: \_\_\_\_\_



Function? **Yes** or **No**

D: \_\_\_\_\_ R: \_\_\_\_\_

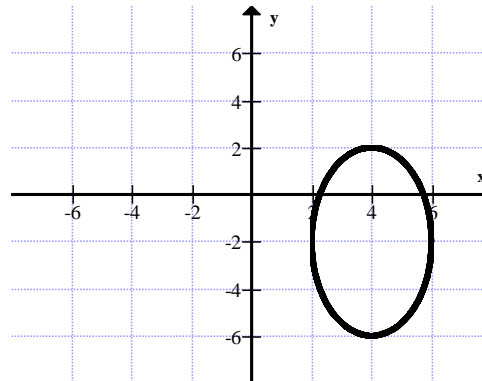
i.



Function? **Yes** or **No**

D: \_\_\_\_\_ R: \_\_\_\_\_

j.



Function? **Yes** or **No**

D: \_\_\_\_\_ R: \_\_\_\_\_

2. Use the given graph of  $y = f(x)$  to answer the following, if possible.

If not possible, write “undefined”.

a. Find  $f(10)$ . \_\_\_\_\_

b. Find  $f(8)$ . \_\_\_\_\_

c. Find  $f(6)$ . \_\_\_\_\_

d. Find  $f(2)$ . \_\_\_\_\_

e. Find  $f(0)$ . \_\_\_\_\_

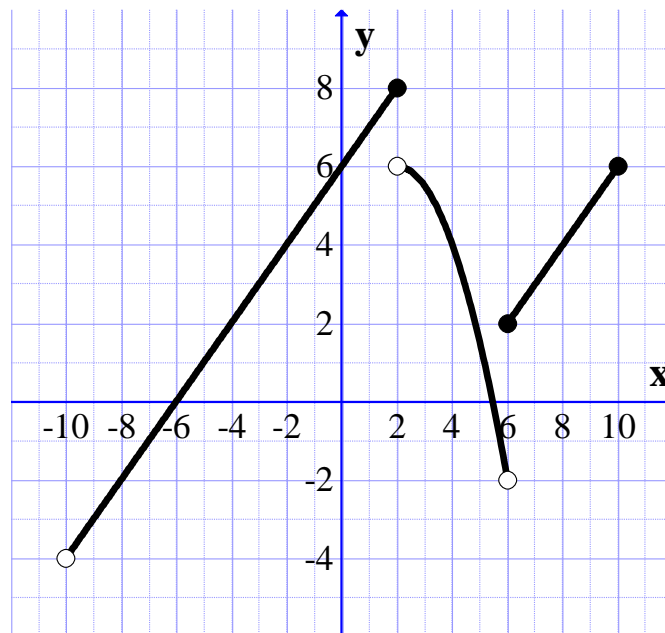
f. Find  $f(-8)$ . \_\_\_\_\_

g. Find  $f(-10)$ . \_\_\_\_\_

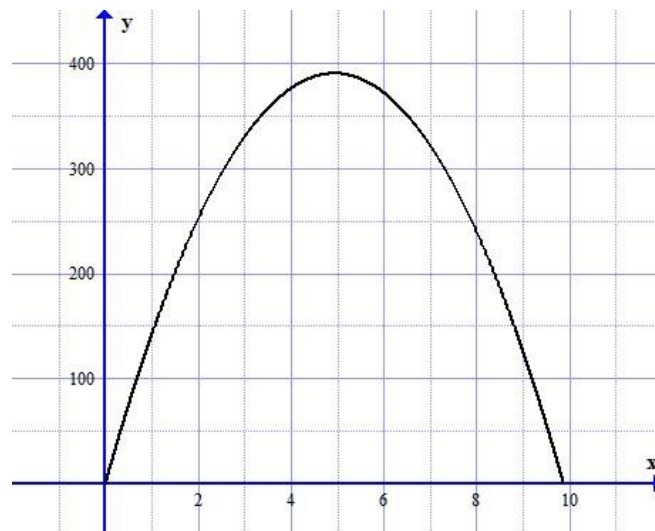
h. Find all  $x$  such that  $f(x) = 4$ . \_\_\_\_\_

i. Find all  $x$  such that  $f(x) = 6$ . \_\_\_\_\_

j. Find all  $x$  such that  $f(x) = -2$ . \_\_\_\_\_



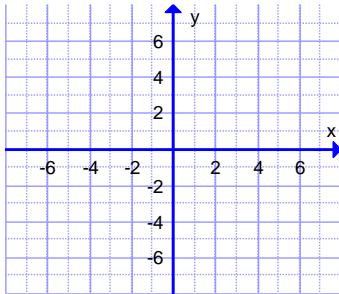
3. A ball is thrown upward with an initial velocity of 158 ft/s. Its height  $h$  in feet after  $t$  seconds is given by  $h(t) = -16t^2 + 158t$ . The ball is in the air for 9.9 seconds. The graph of the height function is given.



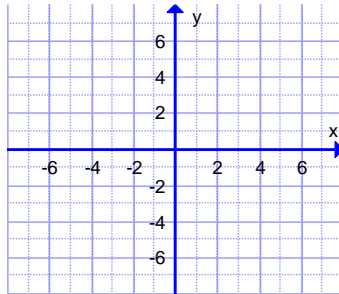
- Label the units on the horizontal axis.
- Label the units on the vertical axis.
- Does the graph represent a function?
- State the domain.
- Maximum height occurs at 4.94 seconds.  
Find the maximum height to the nearest foot.  
Plot your results on the graph as an ordered pair.
- State the range.
- What is the height of the ball at 3 seconds?  
Plot the results on the graph as an ordered pair.
- Interpret  $h(8) = 240$  in a complete sentence. Plot as an ordered pair.

1. Graph each equation carefully. Plot and label at least 3 points.

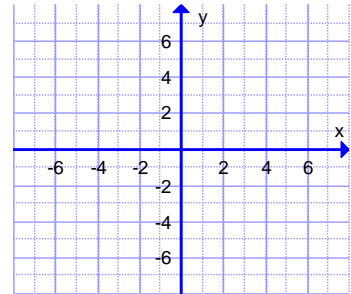
a.  $x + y = -3$



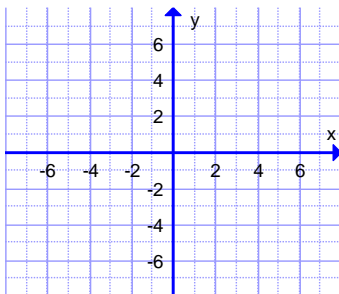
b.  $x - y = 5$



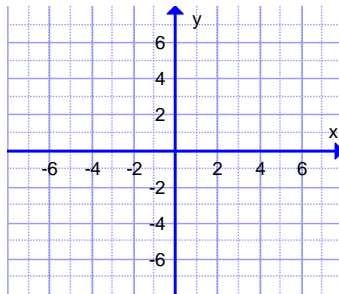
c.  $y = 3x$



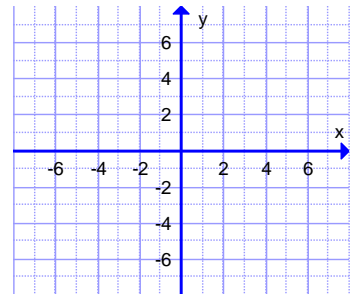
d.  $y = -4x$



e.  $y = -5$



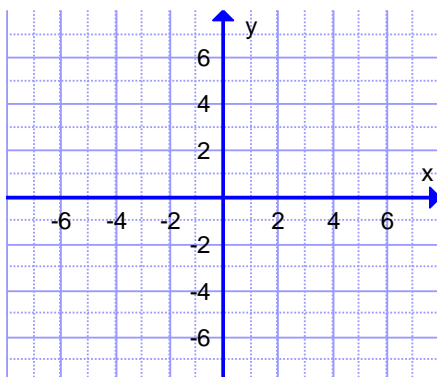
f.  $2x - 3y = 6$



2. Graph both lines on the same axes. Identify the point of intersection.

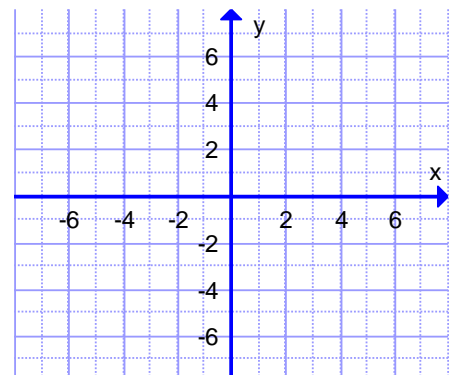
a.  $y = 2x - 1$

$y + x = 5$

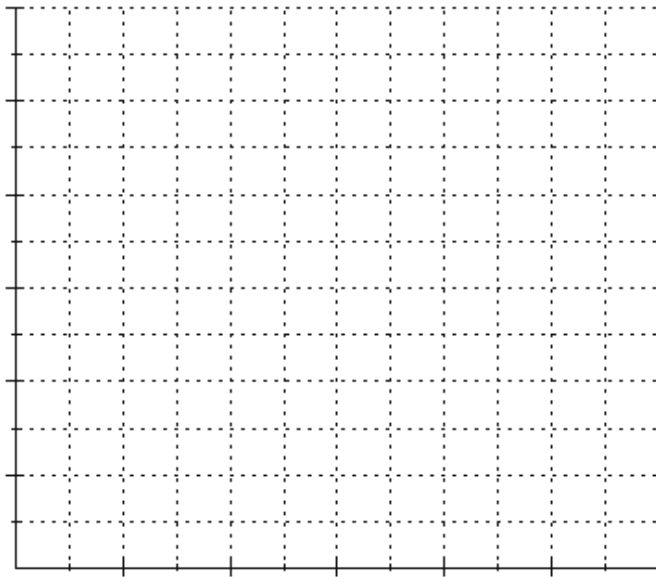


b.  $y = -\frac{2}{5}x + 2$

$x = -5$



3. A moving truck company rents their trucks for a flat fee of \$30 plus \$0.60 per mile.
- We want to write the cost as a function of miles. First we should define our variables.  
x represents \_\_\_\_\_  
y represents \_\_\_\_\_
  - State an equation representing the total cost,  $y$ , of renting a truck for  $x$  miles.
  - Write the equation from part b. using function notation. Evaluate  $f(100)$ .
  - Graph the equation from part **b.** on the axis below. Be sure to scale **and** label the axes.  
(Hint: Plan to travel for at least 100 miles.)



- Plot and label the point  $(40,54)$  on the graph in part d.  
Using a complete sentence, what does this point represent?
- Plot and label the point associated with the  $f(100) = 90$  on the graph in part d.  
Using a complete sentence, what does this point represent?



1. Find the slope of the line that passes through each pair of points.

a. (2,6) and (3,9)

b. (2,6) and (3,6)

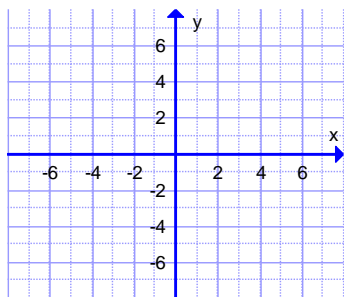
c. (2,6) and (2,3)

2. State the slope and vertical intercept of the line given by each equation.

Equation of line	Slope	Vertical Intercept
$y = -\frac{2}{5}x + 3$		
$y = 4 - x$		
$y = 4$		
$y = -x$		
$y = \frac{1}{2}x$		

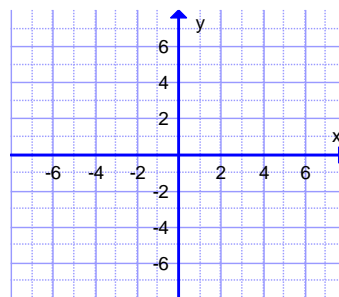
3. Graph the line described in each exercise and give the equation of each line, in slope-intercept form.

a. Slope  $-4$ ; y-intercept: (0,4)



Equation: \_\_\_\_\_

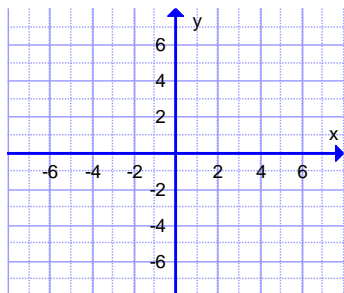
b. Slope 3; y-intercept: (0,-1)



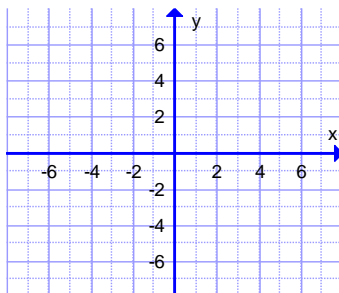
Equation: \_\_\_\_\_

4. Graph each equation.

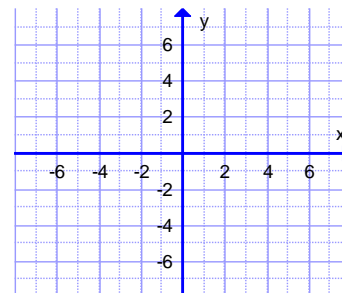
a.  $y = \frac{2}{3}x - 3$



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



c.  $y = -x + 5$



5. In the year 2000, the average cost of an oil change was \$28. By 2010, the average of an oil change was \$35. Let  $x$  represent the number of years since the year 2000.
- Use this information to determine two points: (number years since 2000, cost of oil change).
  - Using function notation, write a **linear** equation that approximates the cost of an oil change in a given year.
  - Identify the vertical intercept in the equation found in (a).  
Interpret the meaning of the vertical intercept in the context of this story problem.
  - Identify the slope of the equation found in (a).  
Interpret the meaning of the slope in the context of this story problem.
  - Use the function in part (a) to predict the average cost of an oil change in 2012.  
Interpret your result with a complete sentence.
  - Use the function in part (a) to predict when the average cost of an oil change will be \$42. Interpret your result with a complete sentence.

1. Write each equation in slope-intercept form:  $y = mx + b$ .

a.  $-3x + 2y = 4$

b.  $5x - 4y = 8$

2. Find the slope-intercept equation of the line with slope  $\frac{3}{4}$  and passes through the point  $(-8, 4)$

a. using slope-intercept form:  $y = mx + b$

b. using point-slope form:  $y - y_1 = m(x - x_1)$

3. Consider the line that passes through the points  $(-2, 5)$  and  $(1, 3)$ .  
Write the equation of the line in slope-intercept form.

4. Mike bills a customer at the rate of \$65 per hour plus a fixed service call charge of \$75.
- Write a linear equation that models the total cost  $f(x)$  where  $x$  represents the number of hours it takes to complete a job.
  - Use** your function from part a. to determine the cost of a job that takes 3.5 hours to complete. Interpret your result with a complete sentence.
  - Use** your function from part a. to determine the number hours to complete the job if the total bill were \$247.25. Interpret your result with a complete sentence.
5. Tell whether the pairs of lines are parallel, perpendicular, or neither.
- $L_1$  through  $(-2,-3)$  and  $(3,-1)$ ;  $L_2$  through  $(-3,1)$  and  $(7,5)$ .
  - $L_1$  with equation  $2x + 4y = 8$ ;  $L_2$  with equation  $4x + 8y = 10$

6. Find the slope-intercept form of the equation of the line with the given properties:

a. passes through the point  $(0,2)$  and parallel to the line  $y = -\frac{2}{3}x + 4$ .

b. passes through the point  $(0,2)$  and perpendicular to the line  $y = -\frac{2}{3}x + 4$

c. passes through the points  $(-1,-1)$  and  $(4,8)$ .

d. passes through the points  $(4,-1)$  and  $(4,8)$ .

e. passes through  $(-3,4)$  and has an undefined slope

f. has y-intercept  $(0,4)$  and a 0 slope

1. A driver used 10.3 gallons of gas driving 337.84 miles. The same driver used 5.4 gallons of gas driving 177.12 miles.
  - a. Use this information to determine two points (gallons, miles) and calculate the rate of change. Interpret the rate of change with a complete sentence.
  
  
  
  
  
  
  
  
  
  
  - b. Model the miles driven,  $y$ , as a linear function of the number of gallons used,  $x$ . Write your equation using function notation.
  
  
  
  
  
  
  
  
  
  
  - c. Use the model to determine how much gas would be required to drive 225 miles (round to one decimal place). Interpret your results in the context of this application.
  
  
  
  
  
  
  
  
  
  
  - d. Use the model to determine how far can the driver go on 12 gallons of gas (to the nearest mile)? Interpret your results in the context of this application.

2. A small company awards its employees annual raises based on years of employment. The annual salary of an employee is shown in the table.

Years employed	Annual salary in dollars
2	34,200
6	40,800

- a. Use this information to determine two points and calculate the rate of change. Interpret the rate of change with a complete sentence.
- b. Model the annual salary as a linear function of the number of years employed.
- c. State the vertical intercept. Interpret the vertical intercept in the context of this application.
- d. Use your model to determine when the employee will be earning \$50,000. Round to the nearest tenth of a year. Interpret your results in the context of this application.
- e. Use your model to determine how much the employee will earn in 15 years. Interpret your results in the context of this application.