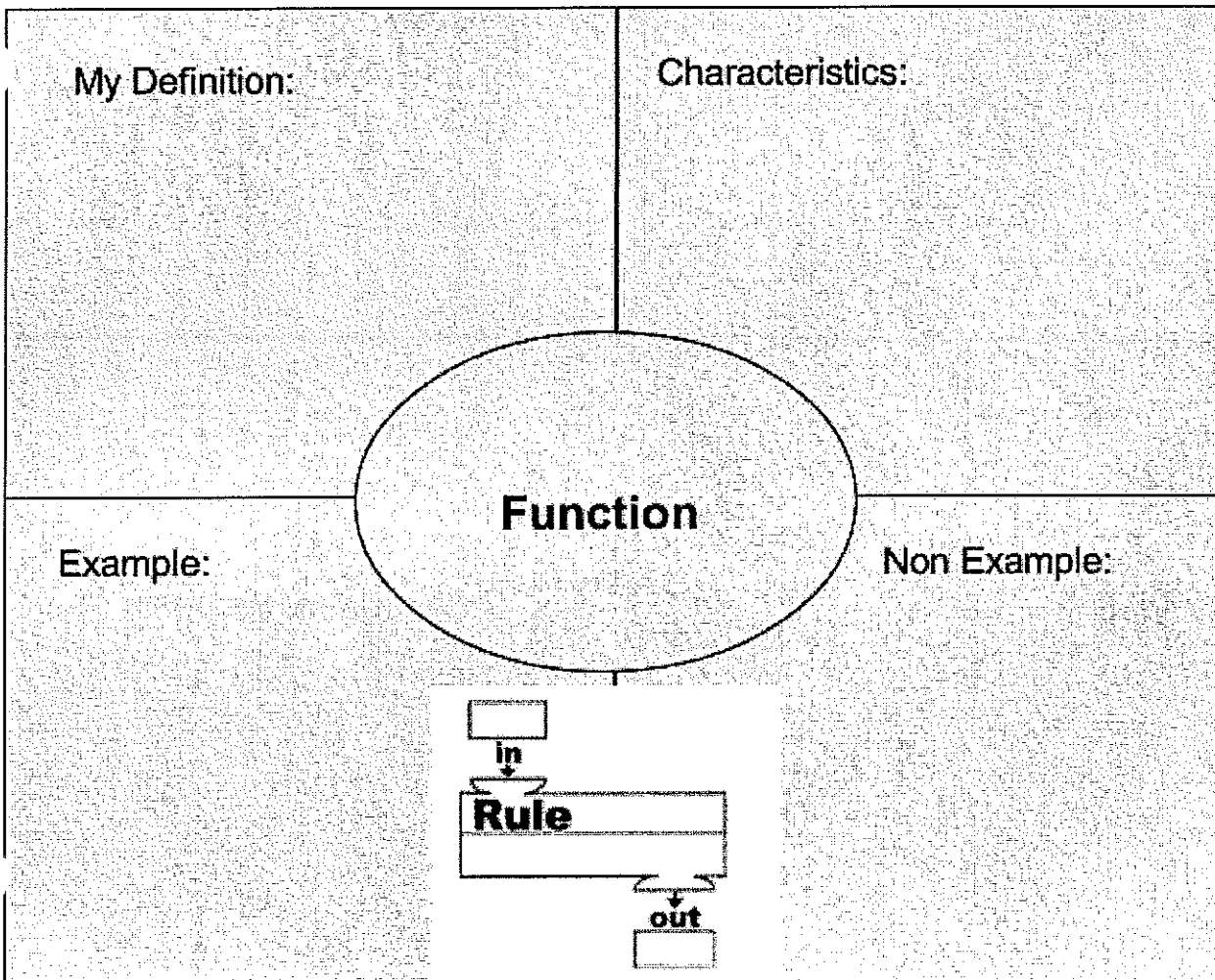
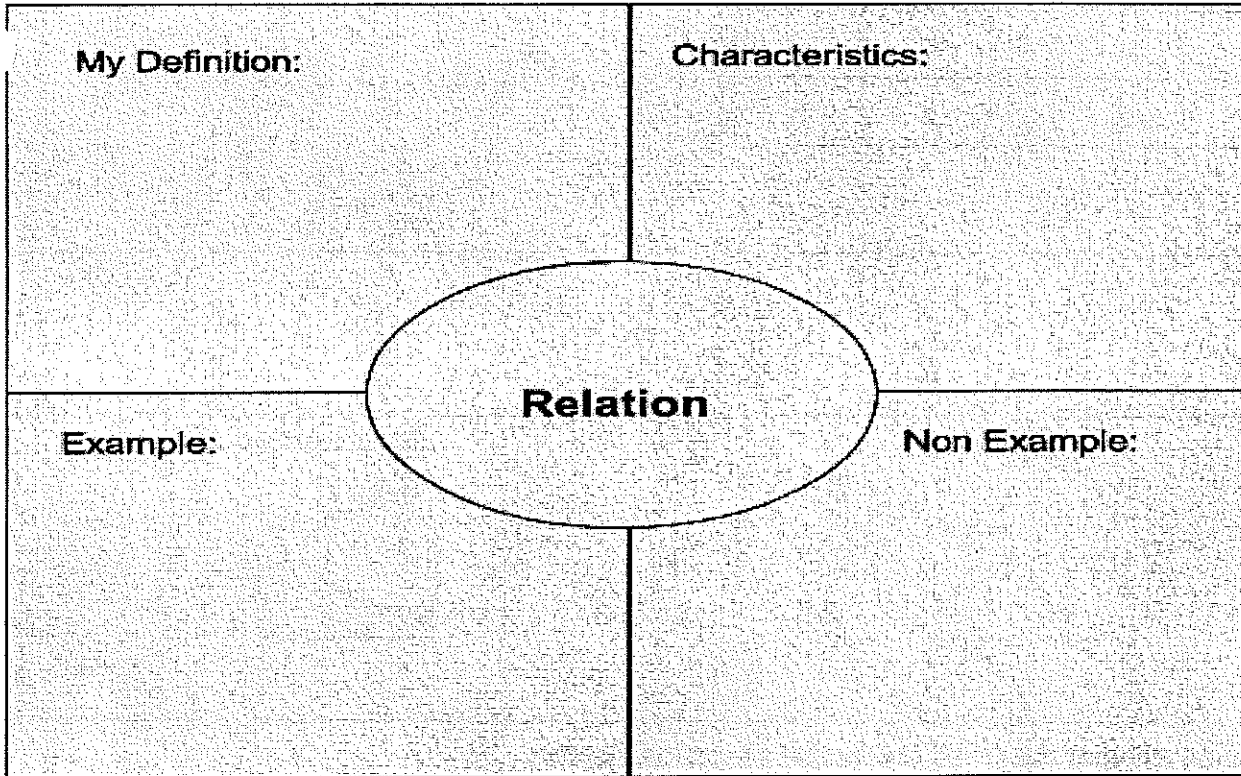


Algebra 1  
Chapter 3

Graphing  
Linear  
Functions

## Section 3.1 Functions



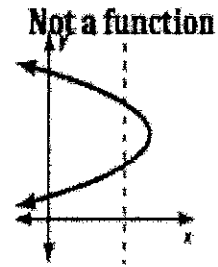
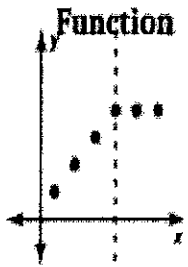
Determine whether the relation is a function. Explain.

1.

Input, x	-2	0	1	-2
Output, y	4	5	4	5

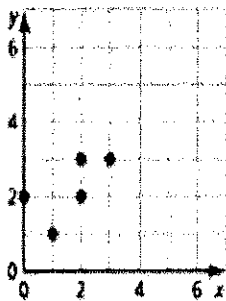
2.

$(0, 3); (1, 1); (2, 1); (3, 0)$

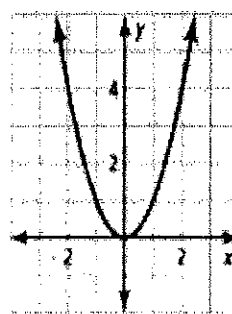


Determine whether the graph represents a function. Explain.

3.



4.



Independent Variable:

Dependent Variable:

Independent Variable	Dependent Variable

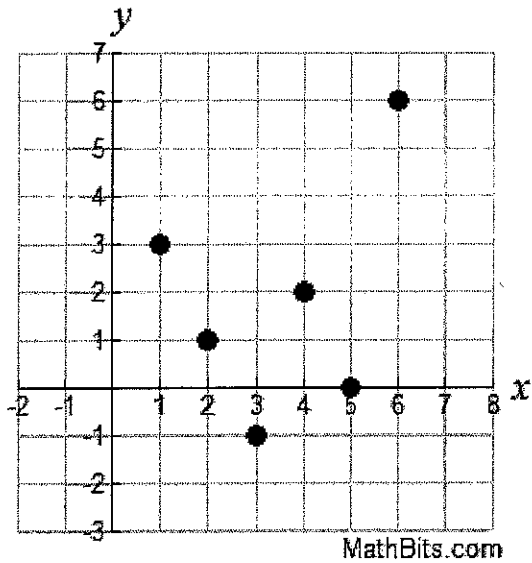
**Domain:**

**Range:**

**Determine if the relation is a function. If it is a function, state the domain and range.**

<p>5. <math>\{(-2, 2); (0, 1); (4, 2); (1, 5)\}</math></p> <p>Function: _____</p> <p>Domain: _____</p> <p>Range: _____</p>	<p>6.</p> <table border="1" data-bbox="837 1614 1495 1761"> <tbody> <tr> <td data-bbox="837 1614 1008 1686">Input</td> <td data-bbox="1008 1614 1130 1686">1</td> <td data-bbox="1130 1614 1252 1686">3</td> <td data-bbox="1252 1614 1373 1686">3</td> <td data-bbox="1373 1614 1495 1686">5</td> </tr> <tr> <td data-bbox="837 1686 1008 1761">Output</td> <td data-bbox="1008 1686 1130 1761">7</td> <td data-bbox="1130 1686 1252 1761">8</td> <td data-bbox="1252 1686 1373 1761">9</td> <td data-bbox="1373 1686 1495 1761">10</td> </tr> </tbody> </table> <p>Function: _____</p> <p>Domain: _____</p> <p>Range: _____</p>	Input	1	3	3	5	Output	7	8	9	10
Input	1	3	3	5							
Output	7	8	9	10							

7.

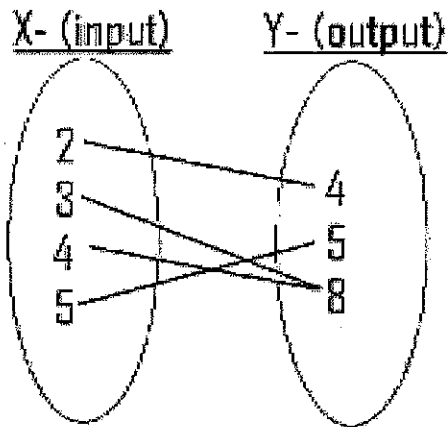


Function: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

8.

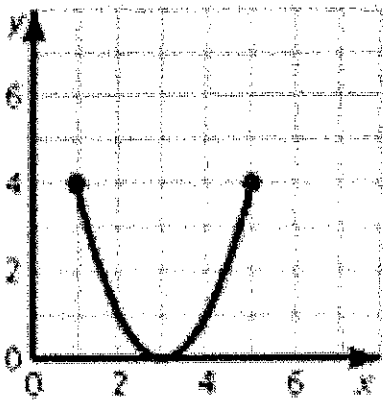


Function: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

7.



Function: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

8. The function  $y = 12x$  represents the number  $y$  of pages of text a computer printer can print in  $x$  minutes.

a. Identify the independent and dependent variables.

b. The domain is 1, 2, 3, and 4. What is the range?

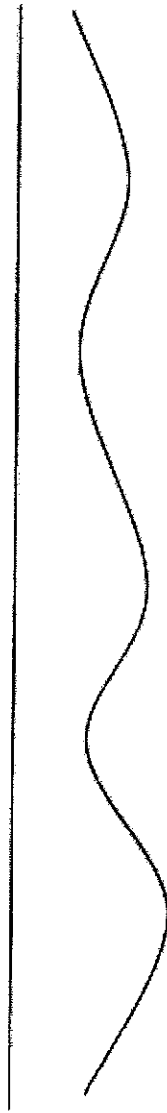
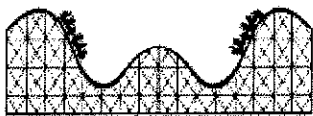
# Relation

**Function**

**Not a Function**

Section 3.2 Linear Functions

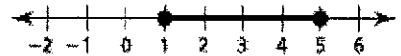
020-10ZCT 2ANZ-1  
1-ZWR 2ANZ-1



Discrete



Continuous



020-10ZCT 2ANZ-1  
1-ZWR 2ANZ-1

## Representing Functions:

Equation	Mapping Diagram	Graphing	Input-Output Table										
$y = x + 3$	<p>Input, x      Output, y</p>		<table border="1"> <thead> <tr> <th>Input, x</th> <th>Output, y</th> </tr> </thead> <tbody> <tr> <td>-1</td> <td>2</td> </tr> <tr> <td>0</td> <td>3</td> </tr> <tr> <td>1</td> <td>4</td> </tr> <tr> <td>2</td> <td>5</td> </tr> </tbody> </table>	Input, x	Output, y	-1	2	0	3	1	4	2	5
Input, x	Output, y												
-1	2												
0	3												
1	4												
2	5												

Determine whether the graph represents a *linear* or *nonlinear* function. Explain.

1.	2.
----	----

Determine whether the table represents a *linear* or *nonlinear* function. Explain.

3. <table border="1"> <tr> <td>x</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>y</td> <td>-1</td> <td>2</td> <td>5</td> <td>8</td> </tr> </table>	x	1	2	3	4	y	-1	2	5	8	4. <table border="1"> <tr> <td>x</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> </tr> <tr> <td>y</td> <td>0</td> <td>-1</td> <td>0</td> <td>3</td> </tr> </table>	x	-1	0	1	2	y	0	-1	0	3
x	1	2	3	4																	
y	-1	2	5	8																	
x	-1	0	1	2																	
y	0	-1	0	3																	

Determine whether the equation represents a *linear* or *nonlinear* function. Explain.

5. $y = 3 - 2x$	6. $y = -\sqrt{x}$
-----------------	--------------------

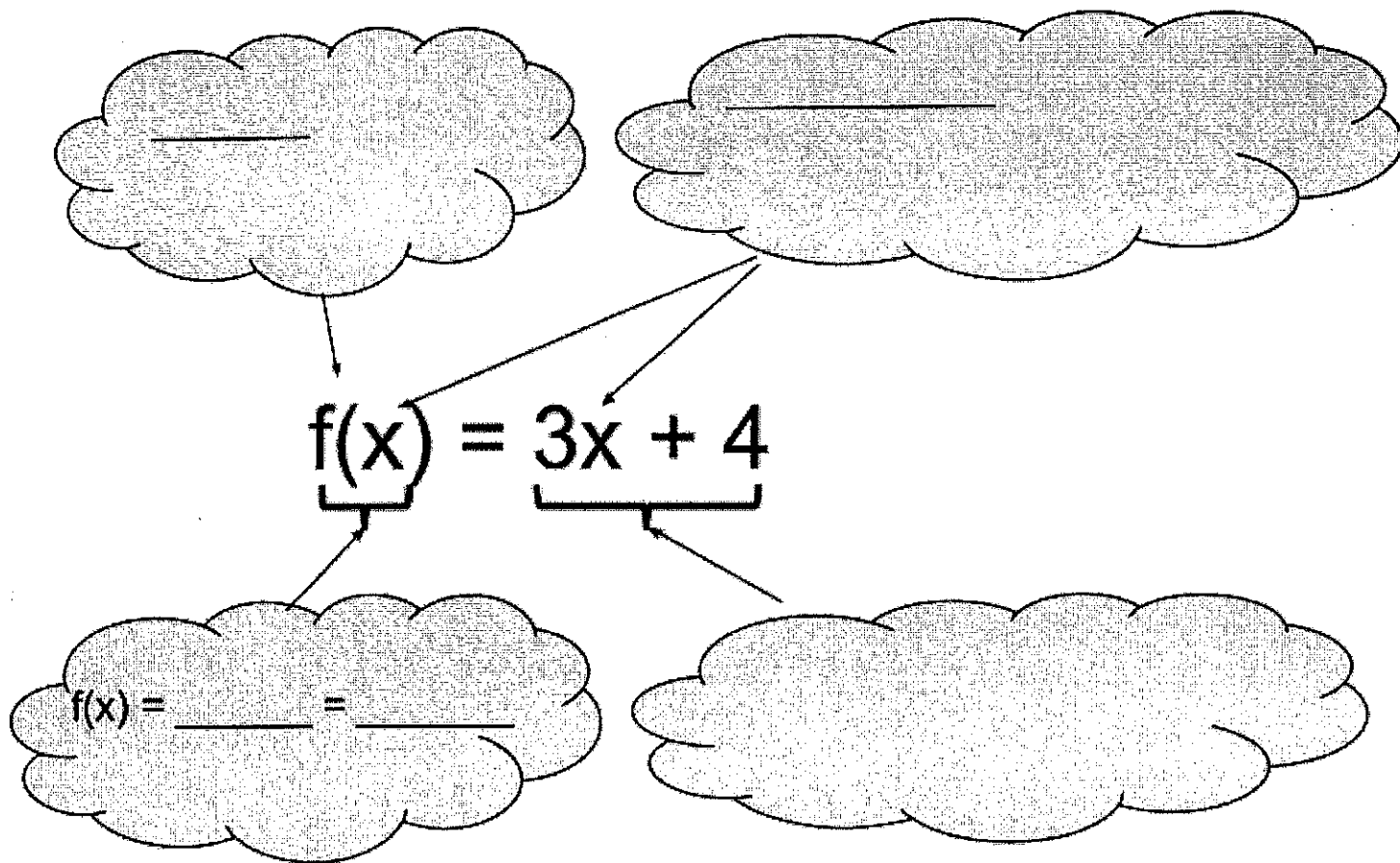
Find the domain of the function represented by the graph. Determine whether the domain is *discrete* or *continuous*. Explain.

7.	8.
----	----

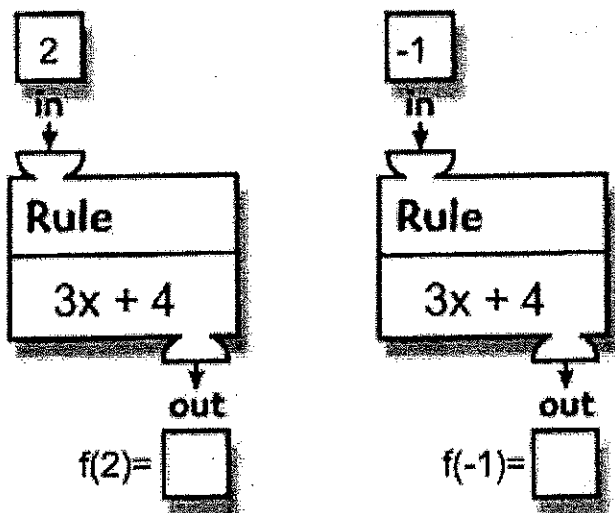


### Section 3.3 Function Notation

A function can be thought of as a \_\_\_\_\_ that assigns \_\_\_\_\_  
\_\_\_\_\_ to \_\_\_\_\_.



Find and illustrate  $f(2)$  and  $f(-1)$  using the function machines below.



Evaluate the function when  $x = \{-4, 0, 2\}$ .

<p>1. <math>f(x) = -x + 5</math></p> <p>a. <math>f(\square) = -\square + 5</math></p> <p>b. <math>f(\square) = -\square + 5</math></p> <p>c. <math>f(\square) = -\square + 5</math></p>	<p>2. <math>g(x) = \frac{1}{2}x</math></p> <p>a. <math>g(\square) = \frac{1}{2}\square</math></p> <p>b. <math>g(\square) = \frac{1}{2}\square</math></p> <p>c. <math>g(\square) = \frac{1}{2}\square</math></p>
---	---

Now you try... Evaluate the function  $d(e) = 15 - 6e$  for  $e = 2$

Find the value of  $x$  so that the function has the given value.

<p>3. <math>f(x) = 4x - 3; f(x) = 33</math></p>	<p>4. <math>b(x) = -3x + 1; b(x) = -20</math></p>
<p>5. <math>m(n) = -\frac{3}{5}n - 4; m(n) = 2</math></p>	

6. Application: Let  $n(t)$  be the number of DVD's you have in your collection after  $t$  trips to the video store. Explain the meaning of each statement.

A.  $n(0) = 8$  \_\_\_\_\_

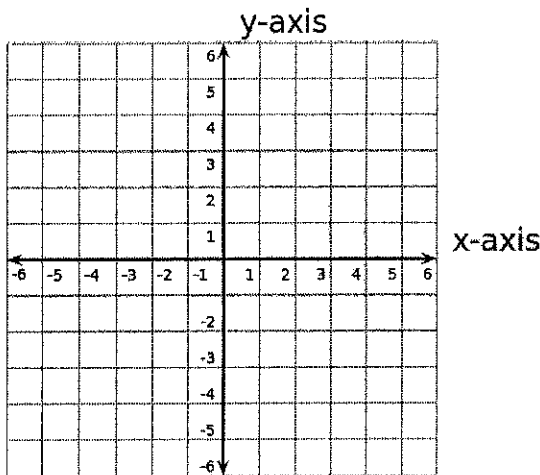
B.  $n(3) = 14$  \_\_\_\_\_

C.  $n(5) > n(3)$  \_\_\_\_\_

Graph each function by making an input/output table of values.

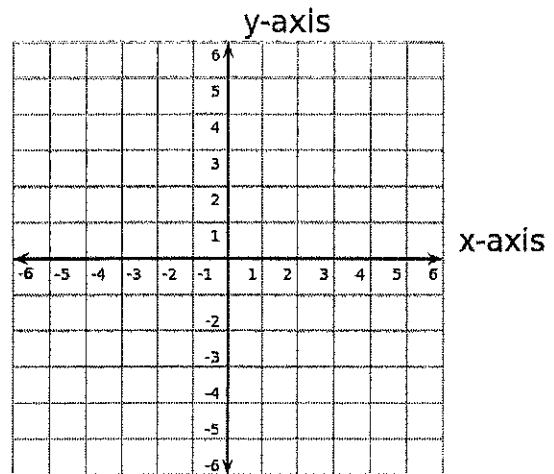
7.  $r(x) = 1 - 2x$

x	$1 - 2x$	$r(x)$



8.  $f(x) = \frac{1}{2}x - 2$

x	$\frac{1}{2}x - 2$	$f(x)$



9. The function  $B(m) = 50m + 150$  represents the balance (in dollars) in your savings account after  $m$  months. The table to the right represents the balance of your friend's savings account.

Month	Balance
2	\$330
4	\$410
6	\$490

a. Explain the meaning of the function  $B(m) = 50m + 150$ .

b. Evaluate  $B(m) = 50m + 150$  for the domain  $m = 2, 4, 6$

c. Who has the better savings plan? You or your friend? Explain.

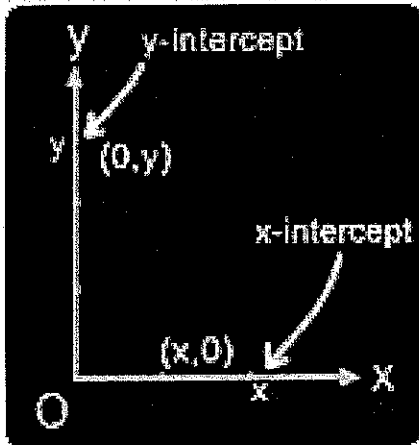
d. How long will it take you to have \$800 in your account? What does the \$800 represent?

Section 3.4 Graphing Linear Equations in Standard Form

# STANDARD FORM

**X-INTERCEPT**

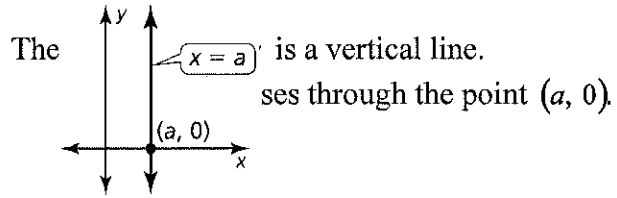
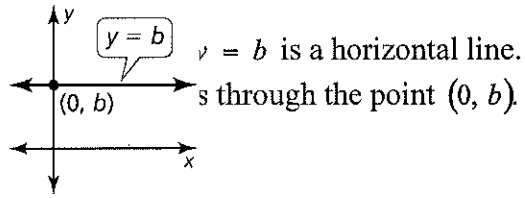
**Y-INTERCEPT**



Steps to graphing a linear equation in standard form.

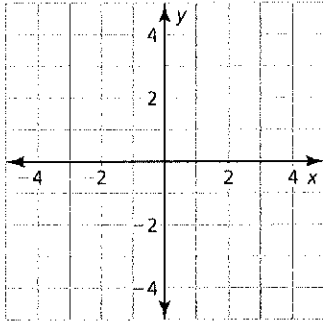
- 1.
- 2.
- 3.

## Horizontal and Vertical Lines

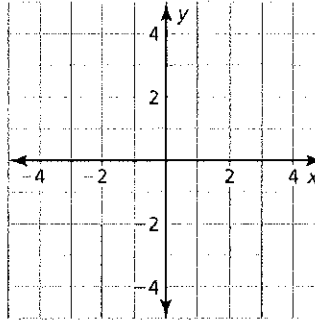


### Graph the linear equation.

1.  $y = -3$



2.  $x = 2$



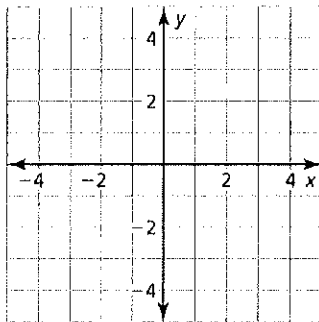
### Find the x- and y-intercepts of the graph of the linear equation.

3.  $3x + 4y = 12$

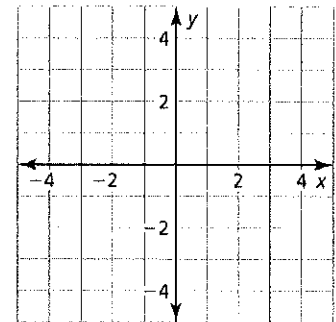
4.  $5x - 2y = -30$

### Use intercepts to graph the linear equation. Label the points corresponding to the intercepts.

6.  $-8x + 12y = 24$

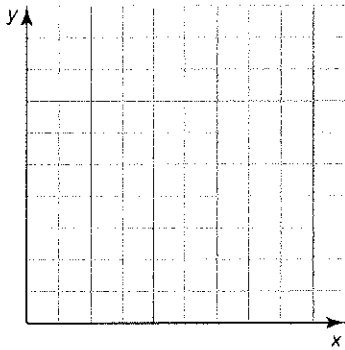


7.  $2x + y = 4$



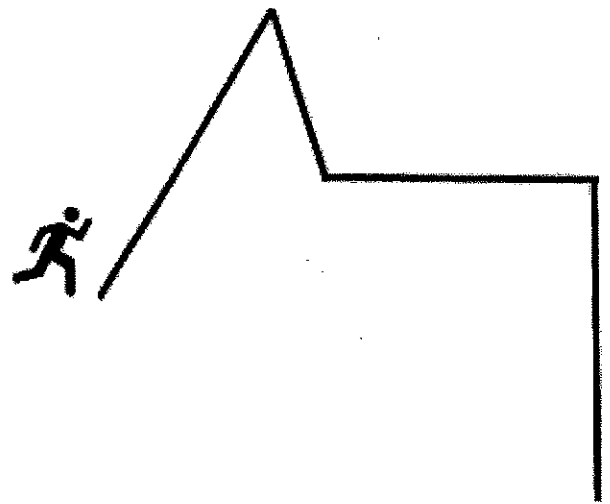
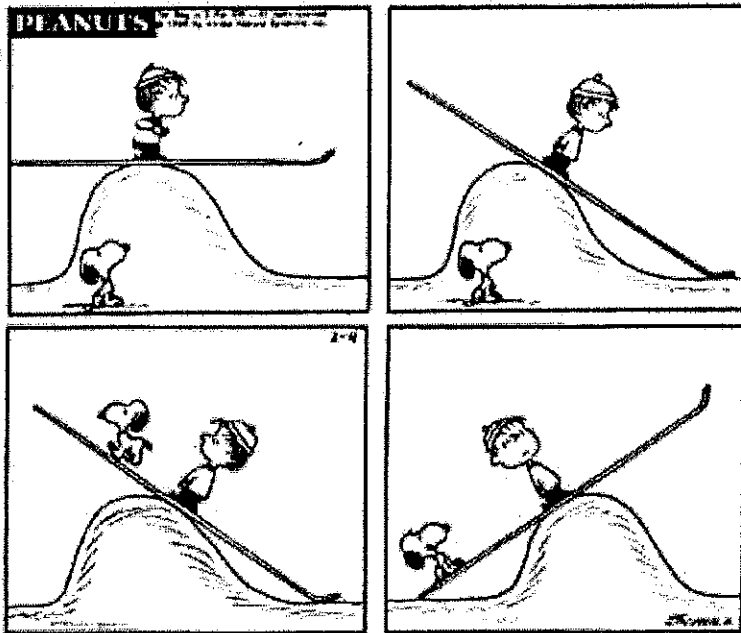
8. The school band is selling sweatshirts and baseball caps to raise \$9000 to attend a band competition. Sweatshirts cost \$25 each and baseball caps cost \$10 each. The equation  $25x + 10y = 9000$  models this situation, where  $x$  is the number of sweatshirts sold and  $y$  is the number of baseball caps sold.

- a. Find and interpret the intercepts.
  
  
  
  
  
  
  
  
  
  
- b. If 258 sweatshirts are sold, how many baseball caps are sold?
  
  
  
  
  
  
  
  
  
  
- c. Graph the equation. Find two more possible solutions in the context of the problem.



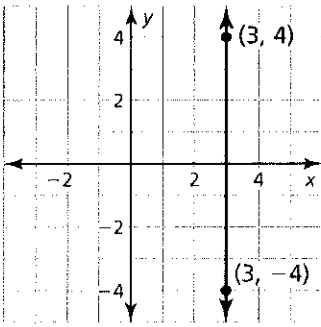
# Section 3.5 Graphing Linear Equations in Slope-Intercept Form

Glue Flip Book Here

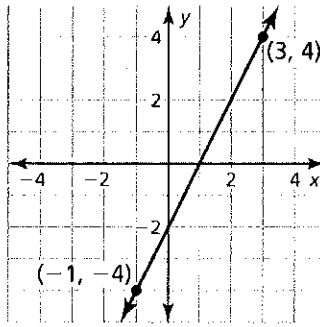


Describe the slope of the line. Then find the slope.

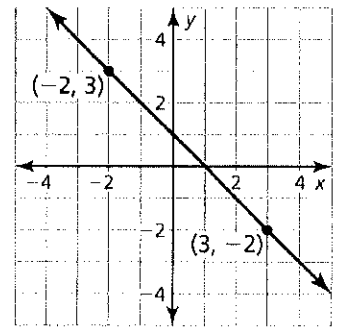
1.



2.



3.



The points represented by the table lie on a line. Find the slope of the line.

4.

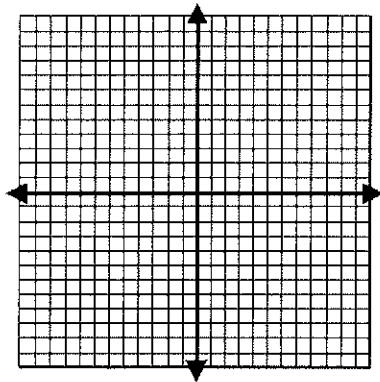
x	1	2	3	4
y	-2	-2	-2	-2

5.

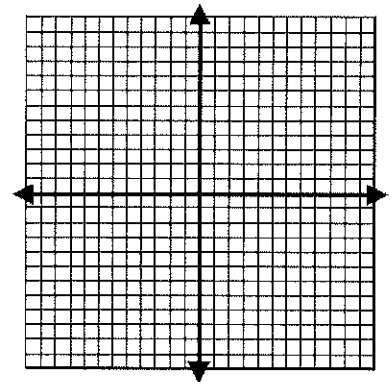
x	-3	-1	1	3
y	11	3	-5	-13

Find the slope and the y-intercept of the graph of the linear equation.

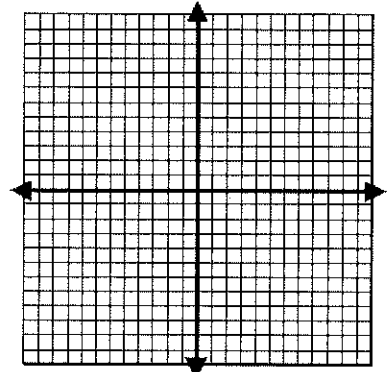
6.  $y = -\frac{3}{2}x + 2$



7.  $y = 5x$

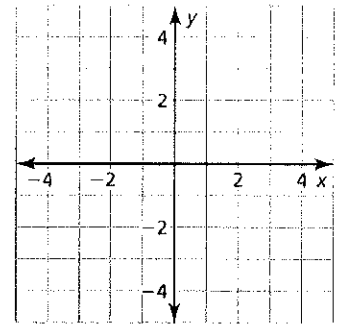


8.  $6x + 4y = 24$





9. A linear function  $f$  models a relationship in which the dependent variable decreases 6 units for every 3 units the independent variable decreases. The value of the function at 0 is 4. Graph the function. Identify the slope,  $y$ -intercept, and  $x$ -intercept of the graph.

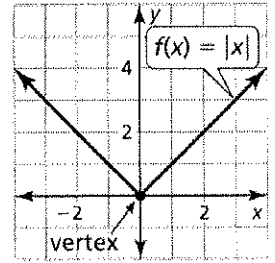


### 3.7 Graphing Absolute Value Functions

absolute value function

vertex

vertex form



Graph each function. Compare the graph to the graph of  $f(x) = x$ . Identify domain and range.

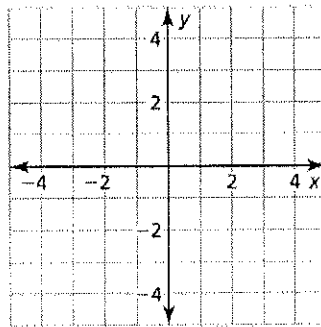
1.  $t(x) = \frac{1}{2}|x|$

vertex:

domain:

range:

comparison:



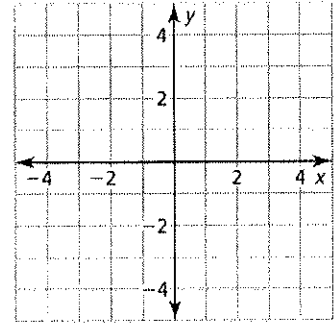
2.  $u(x) = -|x|$

vertex:

domain:

range:

comparison:



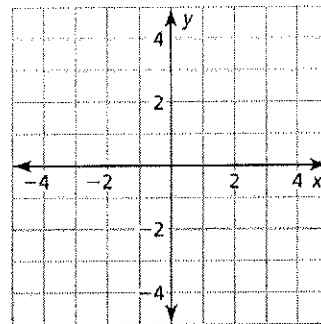
3.  $p(x) = |x| - 3$

vertex:

domain:

range:

comparison:



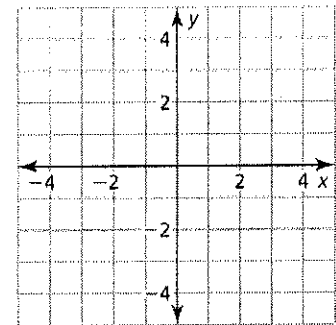
4.  $r(x) = |x + 2|$

vertex:

domain:

range:

comparison:



Graph each function. Compare the graph to the graph of  $f(x) = x$ . Identify domain and range.

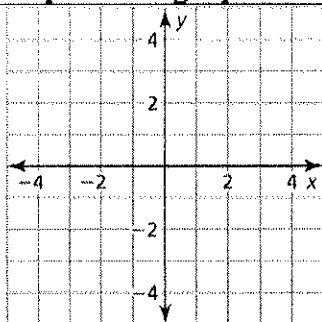
5.  $t(x) = 2|x|$

vertex:

domain:

range:

comparison:



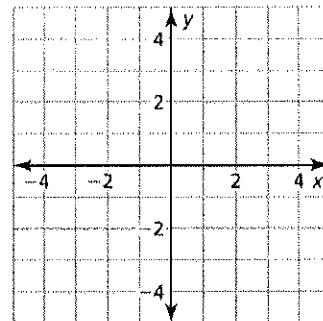
6.  $u(x) = |x - 2| + 3$

vertex:

domain:

range:

comparison:



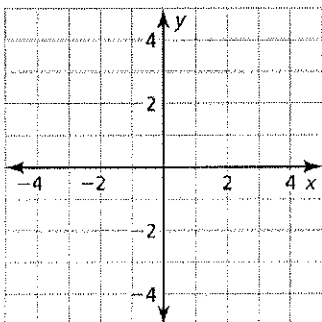
7.  $p(x) = -\frac{1}{3}|x|$

vertex:

domain:

range:

comparison:



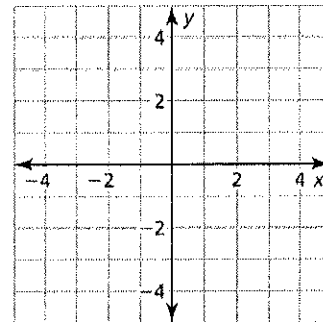
8.  $r(x) = |x + 3| - 4$

vertex:

domain:

range:

comparison:



## Transformation of Graphs of Absolute Value Functions

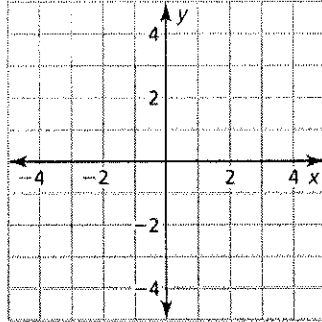
<b>Transformation: <math>y = a x - h  + k</math></b>	
<b><math>a = \text{stretch or shrink}</math></b>	<b><math>a &gt; 1</math></b>

	<b>Horizontal: <math>y = f(x - h)</math></b> <b>Shift left or right</b>  If $h > 0$ , the graph shifts _____.  If $h < 0$ , the graph shifts _____.	<b>Vertical: <math>y = f(x) + k</math></b> <b>Shift up or down</b>  If $k > 0$ , the graph shifts _____.  If $k < 0$ , the graph shifts _____.
<b>Translation Shift</b>	<b>In the x-axis: <math>y = -f(x)</math></b>  Multiply the _____ by $-1$ .	
<b>Reflection</b>	<b>Horizontal: <math>y = f(ax)</math></b>  If $a > 1$ , the graph is _____.  If $0 < a < 1$ , the graph is _____.	<b>Vertical: <math>y = af(x)</math></b>  If $a > 1$ , the graph is _____.  If $0 < a < 1$ , the graph is _____.
<b>Stretches and Shrinks</b>		

Graph each function. Compare the graph to the graph of  $f(x) = x$ . Identify domain and range.

1.  $t(x) = |x - 4| + 2$

vertex: \_\_\_\_\_



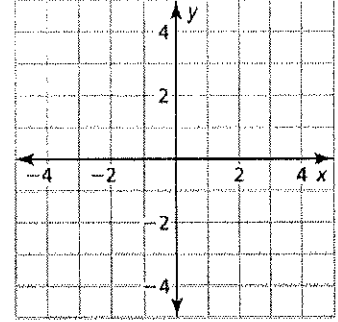
domain: \_\_\_\_\_

range: \_\_\_\_\_

transformation: \_\_\_\_\_

2.  $u(x) = |x + 3| + 1$

vertex: \_\_\_\_\_



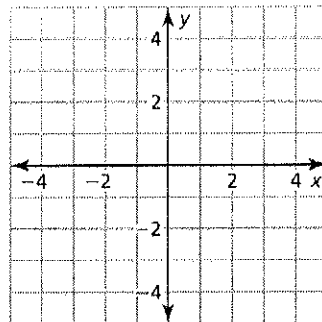
domain: \_\_\_\_\_

range: \_\_\_\_\_

transformation: \_\_\_\_\_

3.  $p(x) = |x - 1| - 2$

vertex: \_\_\_\_\_



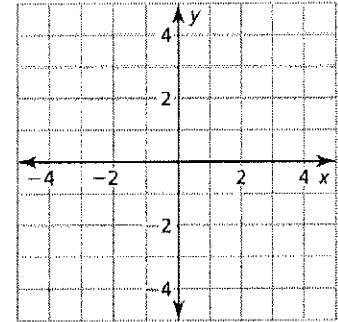
domain: \_\_\_\_\_

range: \_\_\_\_\_

transformation: \_\_\_\_\_

4.  $r(x) = |x + 2| - 4$

vertex: \_\_\_\_\_



domain: \_\_\_\_\_

range: \_\_\_\_\_

transformation: \_\_\_\_\_