MATH Georgia Standards Of Excellence

Sec 2.1 – Solving Algebraic Equations

Name:

Find the value for the variable that makes the statement true. (SHOW WORK NEATLY)

1. $2y - 4 + 5y = 4 - 3y + 5$

2. $3g - 6 + 2g + 1 = 11 - 8g$

3. $-7x = 91$

4. $123 = 3m$

5. $\frac{2}{3}x = 12$

6. $3x + 2 = 14$

7. $2a - 6 = 5a$

8. $32 = -8 - 10b$

9. $3(m - 4) + 2m = 8$

10. $-2(h - 3) + 5h = 5(2 + h)$

I. Eliminate parenthesis by distributing.

Example

$$2(3x - 4) = 5$$

$$6x - 8 = 5$$

II. Eliminate fractions by multiplying each term by the lowest common denominator.

Example

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

$$\frac{12}{1} \cdot \frac{1}{3}x - \frac{12}{1} \cdot \frac{1}{2} = \frac{12}{1} \cdot \frac{x}{4}$$

$$4x \quad - \quad 6 \quad = 3x$$

III. Combine like terms on each side of the equation.

Example

$$4x + 2 - 7x = 2 + x + 8$$

$$-3x + 2 = 10 + x$$

IV. Move the "variable" term to one side of the equation and the constants to the other side using addition or subtraction.

Example

$$3x + 2 = 6x - 5$$

$$-3x \qquad -3x$$

$$2 = 3x - 5$$

$$+5 \qquad +5$$

$$7 = 3x$$

V. Divide both sides by the coefficient (the number in front of the variable).

Example

$$4x = 12$$

$$\frac{4x}{4} = \frac{12}{4}$$

$$x = 3$$

11. $2(w-3)-2w=7$

12. $3(2a+3)-2a=2(5+2a)-1$

13. $\frac{1}{3}x+\frac{3}{2}-\frac{5}{6}x=3$

14. $\frac{2}{5}(x-6)=\frac{5}{2}$

15. $\frac{1}{2}x+\frac{3}{4}-\frac{5}{2}x=\frac{3}{4}+\frac{1}{4}x$

16. $2(2x-2)=1-\frac{5}{2}x+5$

I. Eliminate parenthesis by distributing.

Example

$$2(3x-4)=5$$

$$6x-8=5$$

II. Eliminate fractions by multiplying each term by the lowest common denominator.

Example

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

$$\frac{12}{1}\cdot\frac{1}{3}x-\frac{12}{1}\cdot\frac{1}{2}=\frac{12}{1}\cdot\frac{x}{4}$$

$$4x - 6 = 3x$$

III. Combine like terms on each side of the equation.

Example

$$4x+2-7x=2+x+8$$

$$-3x+2=10+x$$

IV. Move the "variable" term to one side of the equation and the constants to the other side using addition or subtraction.

Example

$$3x+2=6x-5$$

$$-3x \qquad -3x$$

$$2=3x-5$$

$$+5 \qquad +5$$

$$7=3x$$

V. Divide both sides by the coefficient (the number in front of the variable).

Example

$$4x=12$$

$$\frac{4x}{4}=\frac{12}{4}$$

$$x=3$$

17. $3\left(\frac{1}{2}x-\frac{4}{6}\right)=\frac{5}{2}x+5$

18. $3t+4x=6-2x$ (solve for *t*)

19. $2(x+2y)-2=3x+3$ (solve for *y*)

20. a $x+2b=5b-$ c (solve for *b*)

21. If $3a+1-a=9$ then what is the value of $5a+2$?

I. Eliminate parenthesis by distributing.

Example

$2(3x-4)=5$

$6x-8=5$

II. Eliminate fractions by multiplying each term by the lowest common denominator.

Example

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

$\frac{12}{1}\cdot\frac{1}{3}x-\frac{12}{1}\cdot\frac{1}{2}=\frac{12}{1}\cdot\frac{x}{4}$

$4x \quad - \quad 6 \quad = 3x$

III. Combine like terms on each side of the equation.

Example

$4x+2-7x=2+x+8$

$-3x+2=10+x$

IV. Move the "variable" term to one side of the equation and the constants to the other side using addition or subtraction.

Example

$3x+2=6x-5$

$-3x \qquad -3x$

$2=3x-5$

$+5 \qquad +5$

$7=3x$

V. Divide both sides by the coefficient (the number in front of the variable).

Example

$4x=12$

$\frac{4x}{4}=\frac{12}{4}$

$x=3$

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

23. $\frac{x+1}{3}+\frac{2x-1}{2}=\frac{3x-1}{6}$

24. $2^x=64$

25. $3^x=243$

26. $5^x=125$

Sec 2.3 – Solving Algebraic Inequalities

Name:

Find the values for the variable that makes the statement true. (SHOW WORK NEATLY)

1. $3x > 6$

2. $20 \geq 4m$

3. $-3x < 12$

4. $3b + 2 \leq 20$

5. $8a - 12 > 2a$

6. $2p - 6 + 2p + 1 \leq 11 + 8p$

9. $8 \geq 3(m - 4) - 5m$

10. $3x + \frac{3}{4} - \frac{1}{2}x > \frac{5}{2}$

I. Eliminate parenthesis by distributing.

Example

$$2(3x - 4) > 5$$

$$6x - 8 > 5$$

II. Eliminate fractions by multiplying each term by the lowest common denominator.

Example

$$\frac{1}{3}x - \frac{1}{2} \leq \frac{x}{4}$$

$$\frac{12}{1} \cdot \frac{1}{3}x - \frac{12}{1} \cdot \frac{1}{2} \leq \frac{12}{1} \cdot \frac{x}{4}$$

$$4x - 6 \leq 3x$$

III. Combine like terms on each side of the equation.

Example

$$4x + 2 - 7x > 2 + x + 8$$

$$-3x + 2 > 10 + x$$

IV. Move the "variable" term to one side of the equation and the constants to the other side using addition or subtraction.

Example

$$3x + 2 \geq 6x - 5$$

$$-3x \qquad -3x$$

$$2 \geq 3x - 5$$

$$+5 \qquad +5$$

$$7 \geq 3x$$

V. Divide both sides by the coefficient (the number in front of the variable).

Example

$$-4x > 12$$

$$\frac{-4x}{-4} \; ? \; \frac{12}{-4}$$

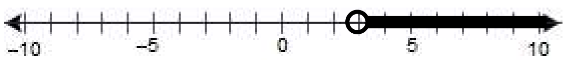
$$x < 3$$

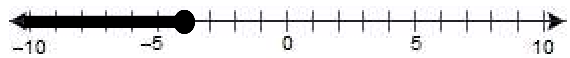
Find the values for the variable that makes the statement true. (SHOW WORK NEATLY)

9. $2^x > 32$

10. $5^x \le 125$

Write an inequality statement for each graph using *x*.

11. 

12. 

Solve the following inequalities for the requested variable.

13. $4x - 2y \ge 6 - 2x$ (solved for y)

14. $3(a - b) + 5b < 8b - 12$ (solved for a)

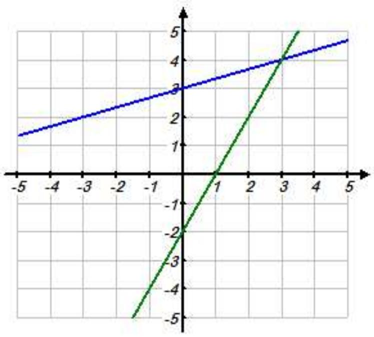
Sec 2.4 – Solving 2 Variable Systems by Graphing

Name:

Each system of equation is shown in graph. Using the graph find the solutions to each of the systems.

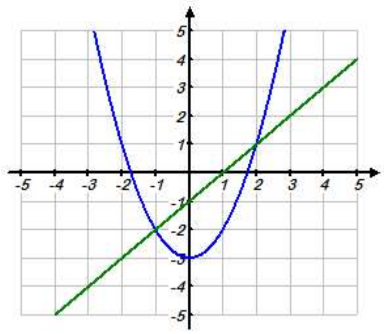
1. $y = \frac{1}{3}x + 3$

   $y = 2x - 2$



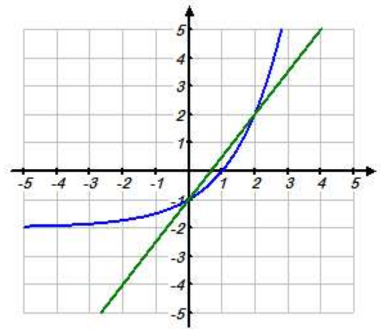
2. $y = x^2 - 3$

   $y = x - 1$



3. $y = 2^x - 2$

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



Which of the system of equations below have a solution of (– 3, 2) ?

4. $\begin{cases} y = 2x + 8 \\ 3x + 2y = -5 \end{cases}$

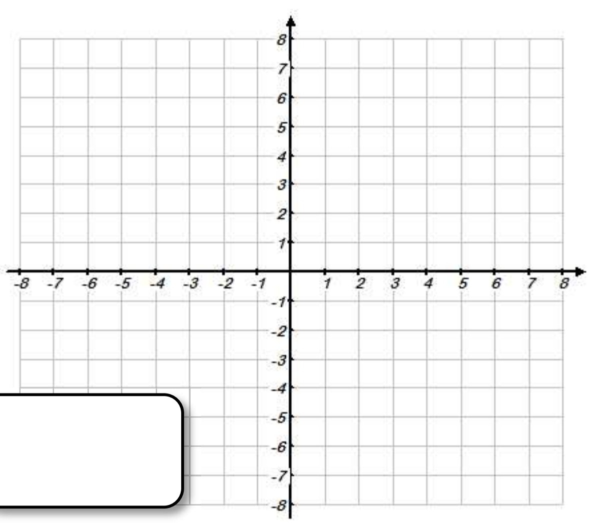
5. $\begin{cases} y = \frac{2}{3}x + 4 \\ x = \frac{1}{2}y - 2 \end{cases}$

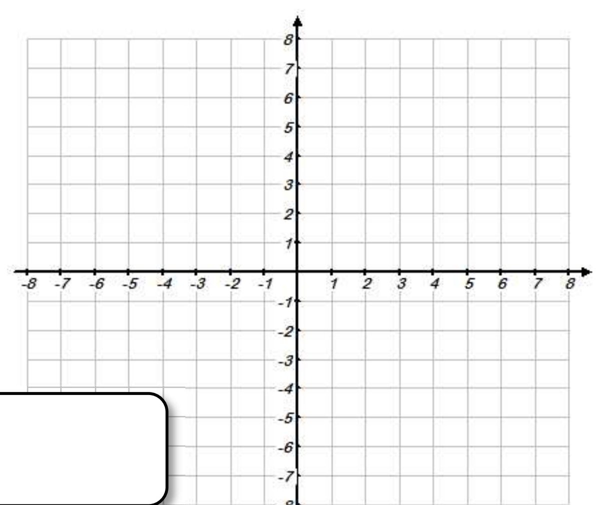
6. $\begin{cases} y + 2x = -4 \\ 3^y + x = 6 \end{cases}$

Graph each system and use the graph to determine a solution.

7. $\begin{cases} y = \frac{1}{2}x - 4 \\ y + 2x = 1 \end{cases}$

8. $\begin{cases} y = -3x - 6 \\ -2x + 3y = 15 \end{cases}$

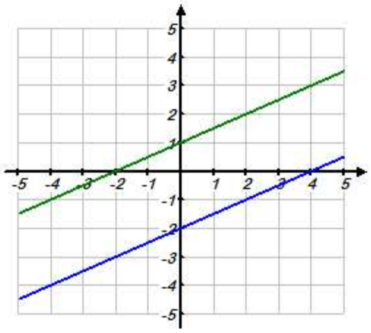




Each system of equation is shown in graph. How many solutions does each system have?

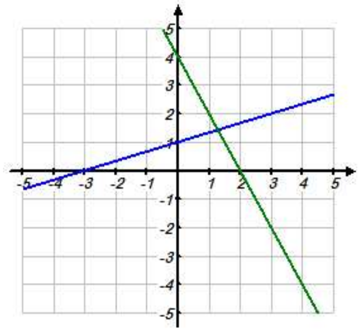
9. $y = \frac{1}{2}x - 2$

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



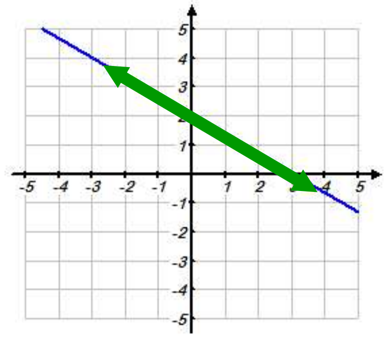
10. $y = \frac{1}{3}x + 1$

$y = -2x + 4$



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

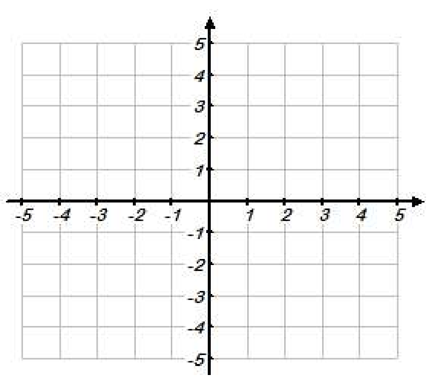
$y = -\frac{2}{3}x + 2$



Graph each system and use the graph to determine a solution.

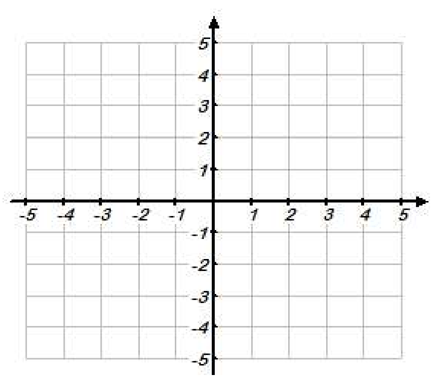
9. $3y = 2x - 6$

$4x - 6y = 12$



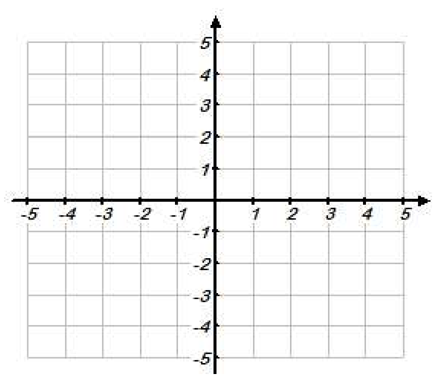
10. $4y - 7 = 2x + 1$

$2y - x = -6$



11. $2x = y + 2$

$3y = -2x + 9$

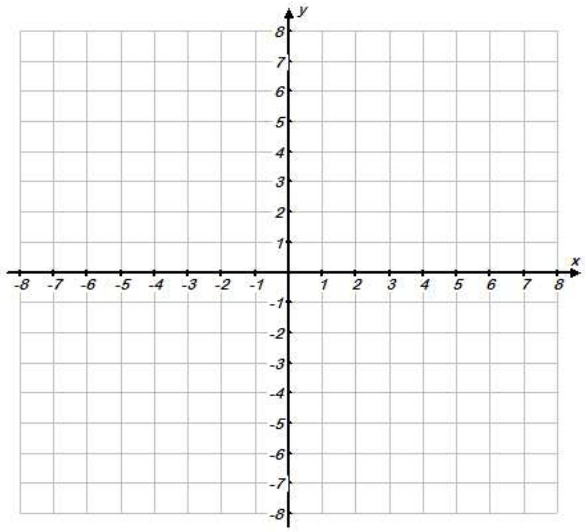


Sec 2-7 Systems of Inequalities

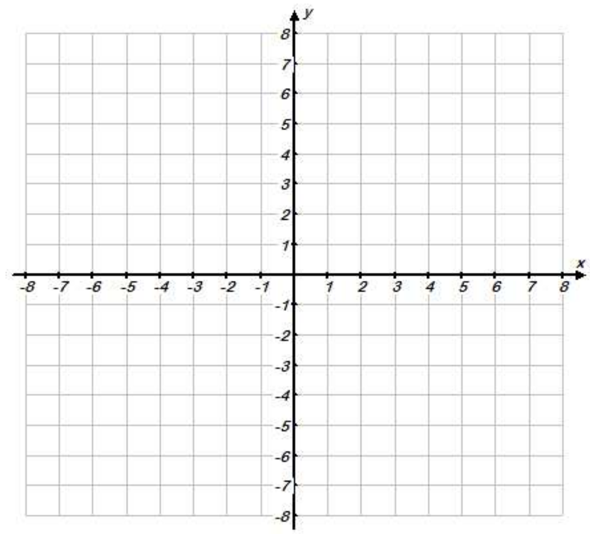
Name:

1. Graph the following inequalities:

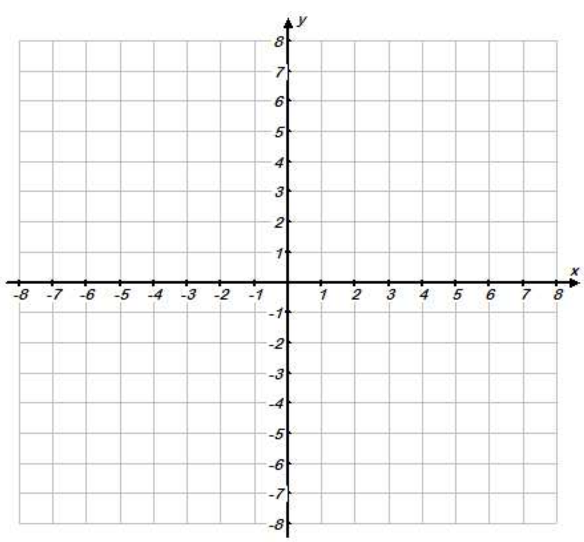
a. $y \leq \frac{3}{4}x - 2$



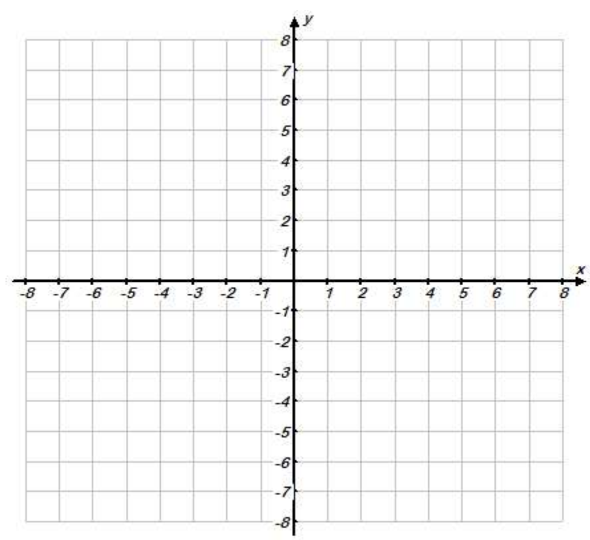
b. $y > -2x + 4$



c. $3y + 9x \geq 3x - 12$

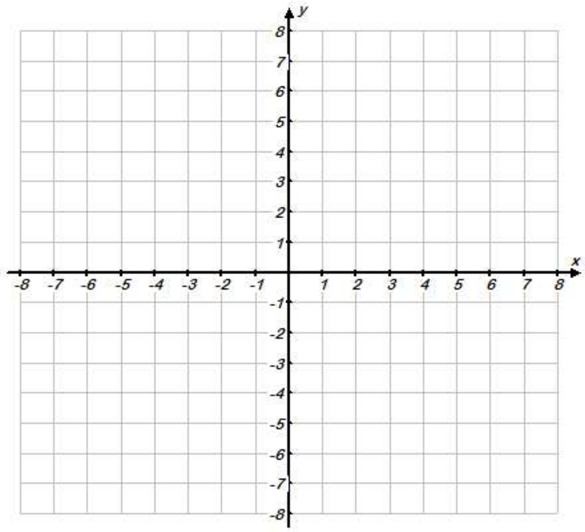


d. $3x - 8 < -2y$

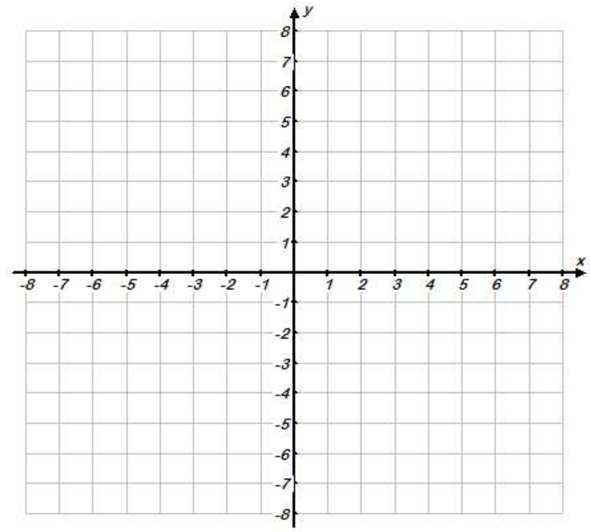


2. Graph the following inequalities:

a. $y \leq 3$



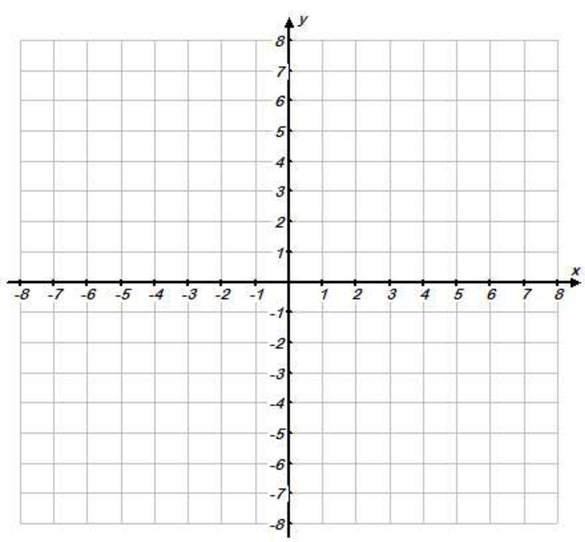
b. $x > -5$



3. Graph the following systems inequalities:

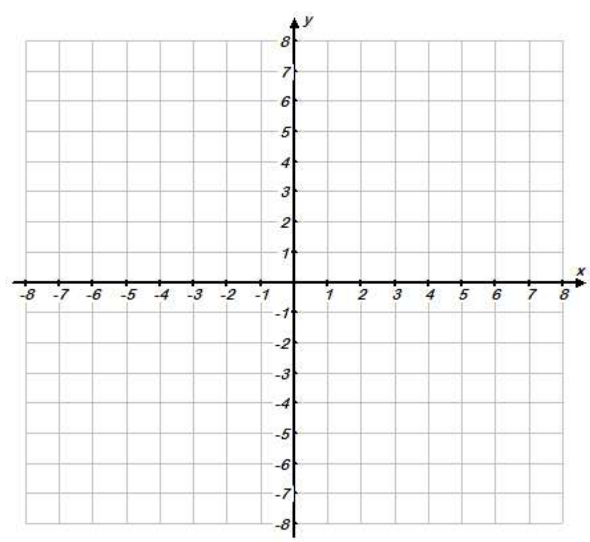
a. $y > \frac{1}{2}x - 4$

$-2x \geq y - 3$



b. $3y + 2x \leq 6$

$3y > y - 4$

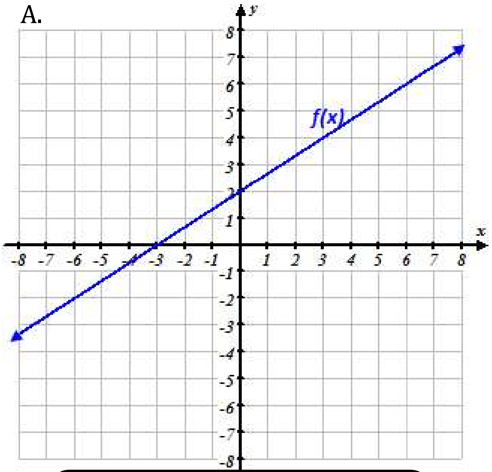


Sec 2.9 – Functions
Building Linear & Exponential Functions

Name:

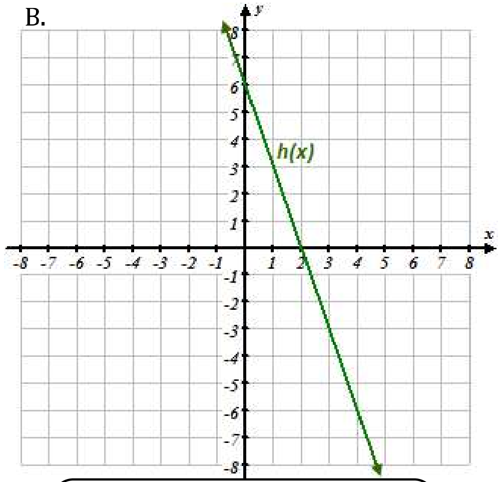
1. Write an equation to describe each **linear function** graphed below.

A.



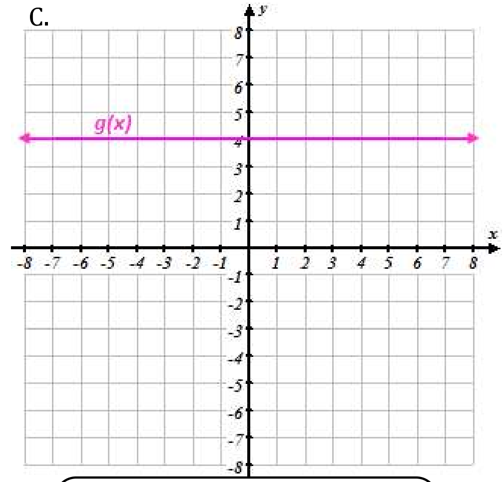
f(x) =

B.



h(x) =

C.



g(x) =

2. Write an equation to describe each **linear function** graphed below.

A. The linear function, *f(x)*, has a slope of ½ and a y-intercept of 4.

f(x) =

B. The linear function, *g(x)*, passes through the point (3,1) and has a slope of ⅔.

g(x) =

C. The linear function, *h(x)*, passes through the points (2, 4) and (6, 2).

h(x) =

D. The linear function, *p(x)*, is parallel to the function $t(x) = \frac{1}{4}x + 2$ and passes through the point (8, 1).

p(x) =

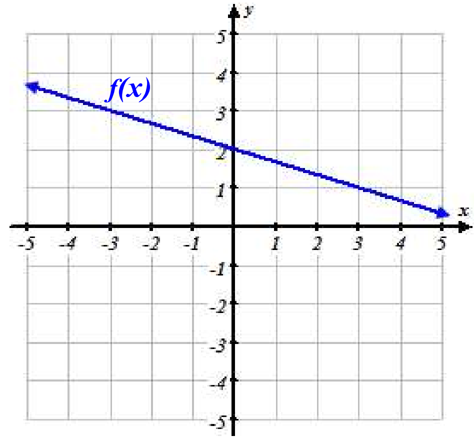
3. Write an equation to describe each **linear function** graphed below.

A. Determine an equation that describes *d(x)* based on the partial set of values in the table below.

x	−2	0	2	4	6
d(x)	1	2	3	4	5

***d(x)* =**

B. Determine an equation that describes *m(x)*, given that *m(x)*, is parallel to *f(x)* *(shown in the graph at the right)* and it passes through the point (3, −2).



***m(x)* =**

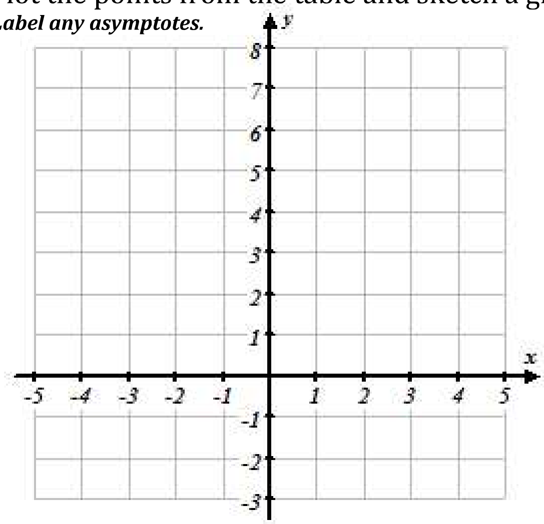
4. Consider the **exponential function**, $f(x) = 2^x$.

A. Fill in the missing values in the table below.

x	*f(x)*
3	
0	
	4
1	
−1	
−3	

B. Plot the points from the table and sketch a graph

Label any asymptotes.



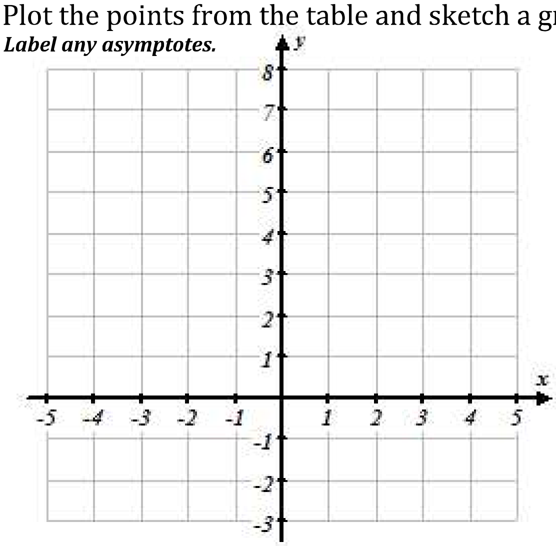
5. Consider the **exponential function**, $g(x) = 3^x - 2$.

A. Fill in the missing values in the table below.

x	*g(x)*
2	
3	
	1
0	
−1	
−3	

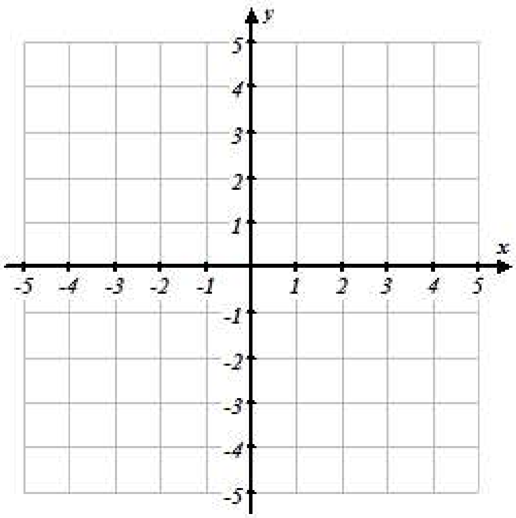
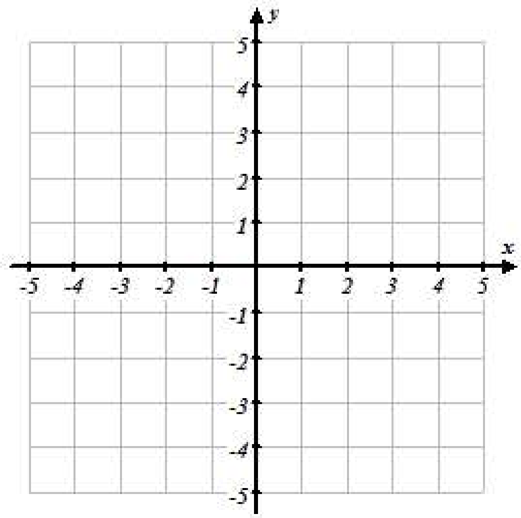
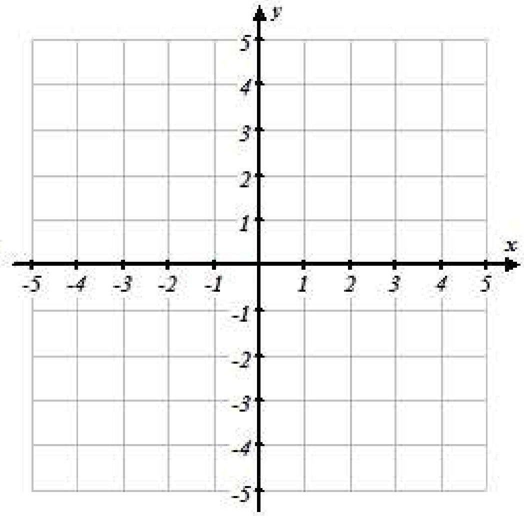
B. Plot the points from the table and sketch a graph

Label any asymptotes.



6. For each of the functions, determine the asymptote and sketch a graph (label the points when x = 0 and when x = 1.)

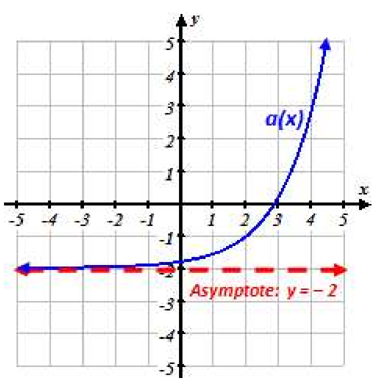
A. $f(x) = 4^x - 4$ B. $g(x) = \left(\frac{1}{2}\right)^x + 1$ C. $h(x) = 2 \cdot 3^x - 3$

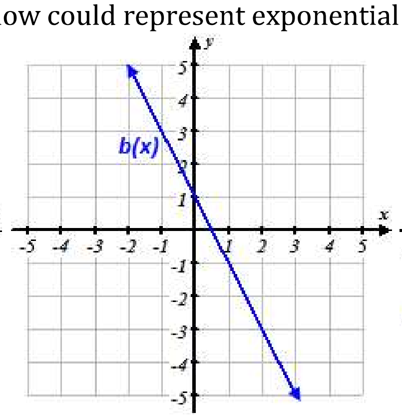




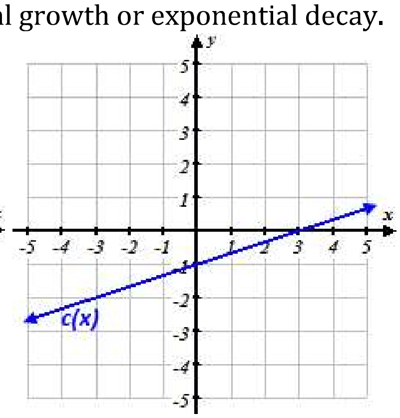
7. Create two different exponential functions of the form $f(x) = a \cdot b^x + c$ that have a horizontal asymptote at $y = 2$.

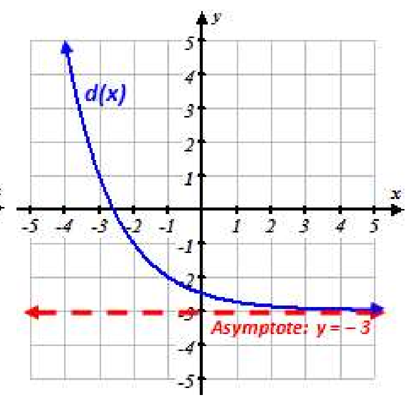
8. Given the function $f(x)$ is of the form $f(x) = a \cdot b^x + c$, has a horizontal asymptote at $y = 2$, and passes through the point (0,5), create a possible function for $f(x)$.

9. Tell which functions below could represent exponential growth or exponential decay.









x	0	1	2	3	5
f(x)	3	5	7	9	13

x	1	2	3	4	5
g(x)	65	33	17	9	5

x	1	2	3	4	5
h(x)	3	7	19	55	163

$j(x) = 4x + 2$ $k(x) = 192 \cdot (0.5)^x + 8$ $m(x) = 3 \cdot (1.5)^x + 2$ $n(x) = -\frac{1}{2}x + 6$

10. In a science experiment, a student is measuring the height of a plant each week. The student began the project on week 0 with the plant already 4 inches tall. The student determined that the plant would increase in height by 20% each week (for the first 10 weeks). Create an exponential function of the form $f(t) = a \cdot b^t$ that describes the height of the plant as a function of t, where t is the number of weeks after the project began.

Sec 2.10 – Functions
Domain and Range

Name:

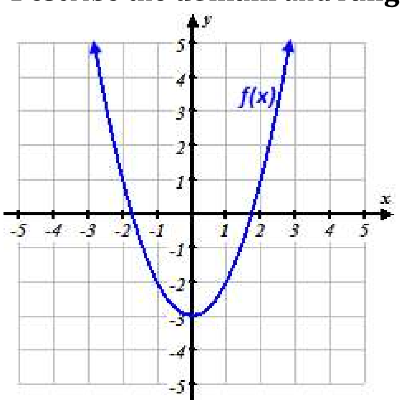
1. What is the **domain** and **range** of the function described by the set of points: $\{(3,5),(2,6),(-5,3)(-7,1),(2,6)\}$

2. Given $f(x) = \frac{1}{2}x + 6$ and its **domain** is described by the set $\{6,-8,4,2\}$ what is the range?

3. Given $f(x) = 2x - 1$ and its **range** is described by the set $\{5,-3,1,9\}$ what is the domain?

4. Describe the **domain** and **range** and label the x and y – intercepts on the graphs of the following graphed functions:

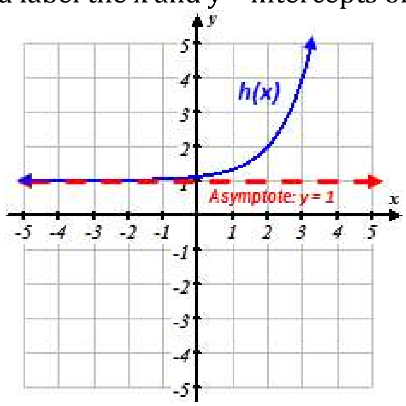
A.



Domain:

Range:

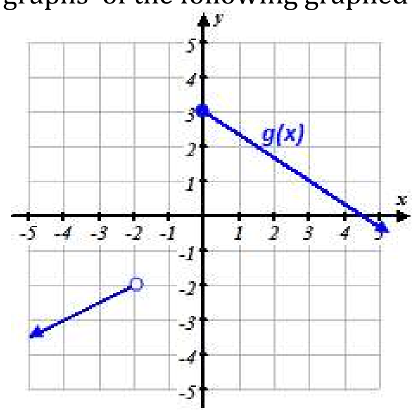
B.



Domain:

Range:

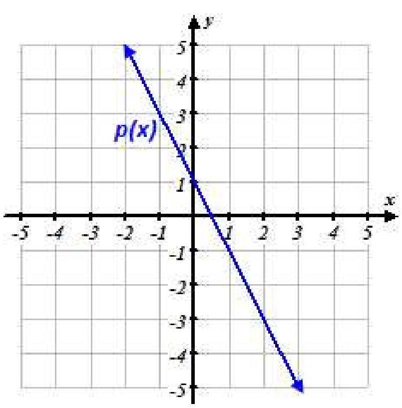
C.



Domain:

Range:

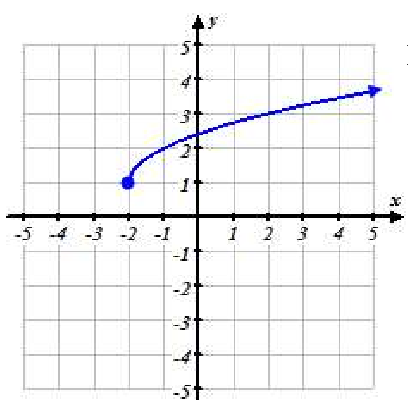
D.



Domain:

Range:

E.



Domain:

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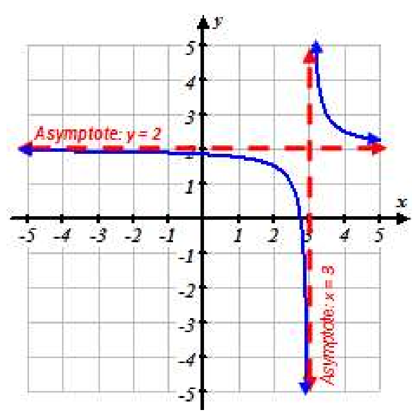
F.



Domain:

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5. Determine which of the following variables are **DISCRETE** and which are **CONTINUOUS.**

a. The variable ***x*** represents the number of friends a person has on their Facebook account.

5a. circle one: **DISCRETE CONTINUOUS**

b. The variable ***x*** represents the number of questions a student missed on a test.

5b. circle one: **DISCRETE CONTINUOUS**

c. The variable ***x*** represents the amount of time it takes a student to complete the test.

5c. circle one: **DISCRETE CONTINUOUS**

d. The variable ***x*** represents the height of a student.

5d. circle one: **DISCRETE CONTINUOUS**

e. The variable ***x*** represents the value of the money each student has with them in class.

5e. circle one: **DISCRETE CONTINUOUS**

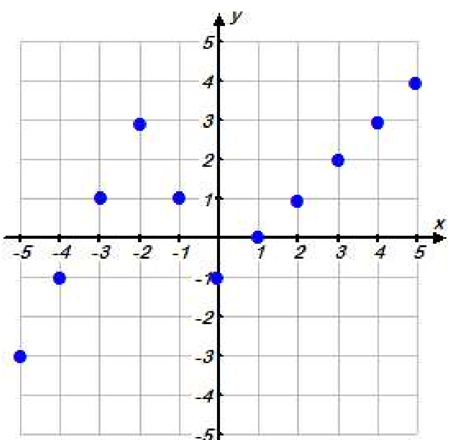
f. The variable ***x*** represents the weight of a package sent at the post office.

5f. circle one: **DISCRETE CONTINUOUS**

g. The variable ***x*** represents the number of packages delivered at a post office on a given day.

5g. circle one: **DISCRETE CONTINUOUS**

6. Describe the domain and range of each function below as **DISCRETE** or **CONTINUOUS**



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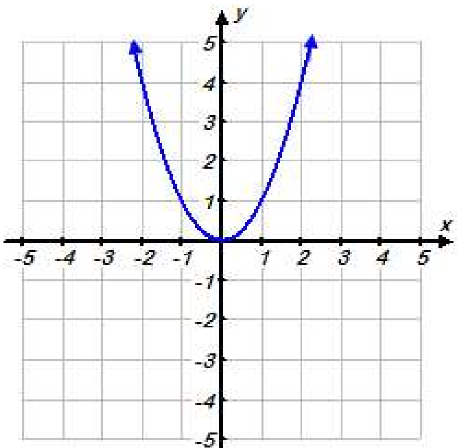

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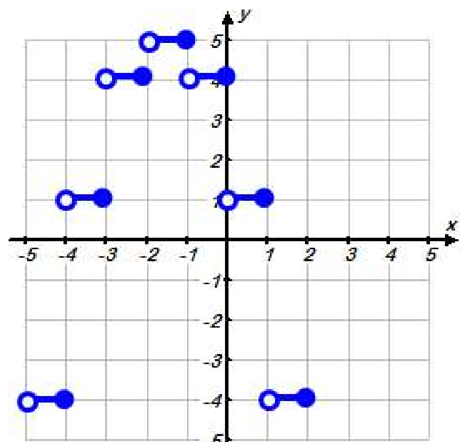

Domain:

Range:

7. Find the x and y –intercepts of the following functions.

A. $f(x) = \frac{1}{2}x + 6$

B. $g(x) = 3^x - 9$

C.

x	2	4	6	8	10
$h(x)$	6	5	4	3	2

- *assume h(x) is continuous and has a domain of all real numbers*

x-intercept: **y-intercept:**

x-intercept: **y-intercept:**

x-intercept: **y-intercept:**