

Semester 1 Review

1) Given the functions $f(x) = \sqrt{x+4}$ and $g(x) = x^2 - x$, determine each of the following values.

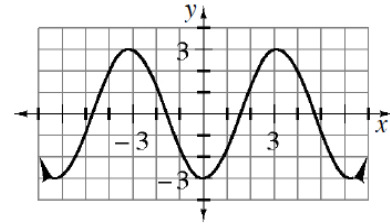
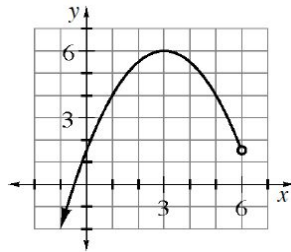
a. $f(5)$

b. $g(a+1)$

c. x if $f(x) = 10$

d. x if $g(x) = 6$

2) Describe the domain and range for each function.



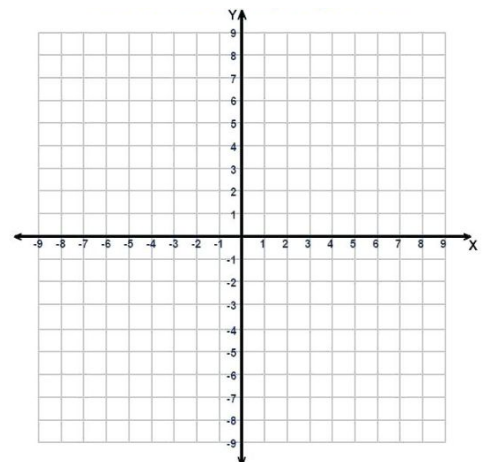
3) Solve each equation.

a. $\frac{x+2}{5} = \frac{10-2x}{3}$

b. $x - 5x^{1/2} = -6$

c. $2k - 3x = kx + 5$

4) Create a complete graph of the function $f(x) = x^2 - 2x - 8$ and fully describe it.



5) Solve each quadratic equation.

a. $x^2 - x - 6 = 0$

b. $5x^2 - 8 = 12x$

6) Gloria the grasshopper is working on her hops. She is trying to jump as high and as far as she can. Her best jump so far is 28 cm long and 20 cm high. Sketch a graph and write an equation of the parabola that describes the path of her best jump.

7) Use what you know about transforming parent functions to write an equation for each of the functions described below.

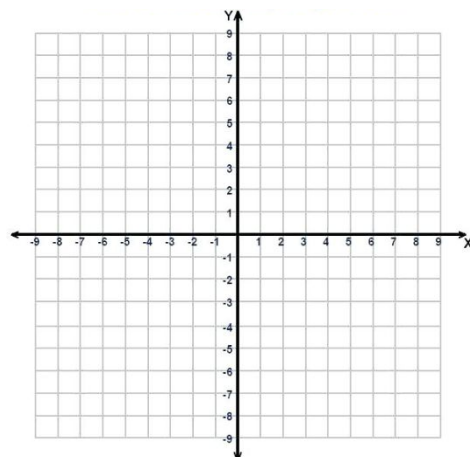
a. A parabola stretched by a factor of 0.25, opening downward and shifted 12 units down and 3 units left.

b. A cubic function with a stretch factor of 2 and a locator point at $(-6, 1)$.

8) Graph the two functions below. Where do they intersect?

$$f(x) = x^2 - 3x - 10$$

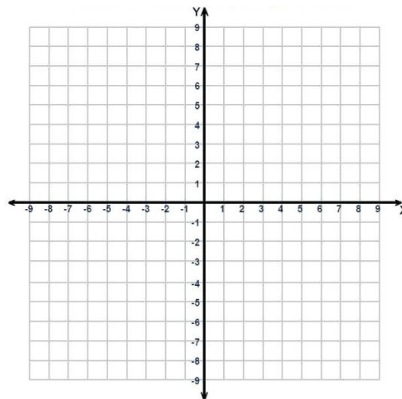
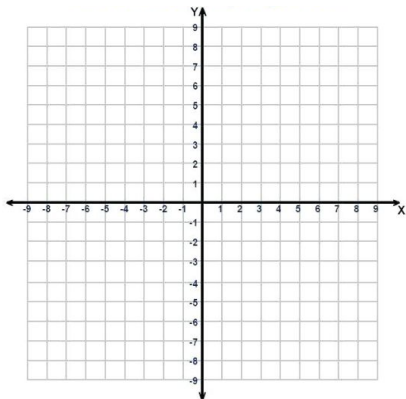
$$g(x) = -5x - 7$$



9) For each function or equation, state the locator point (h, k) and then draw the graph.

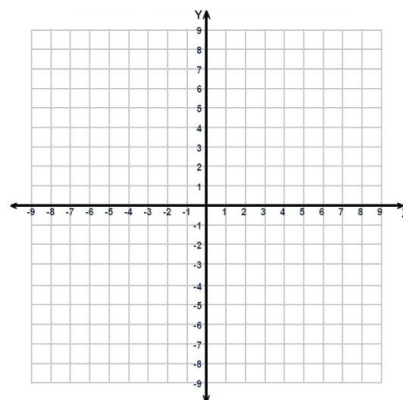
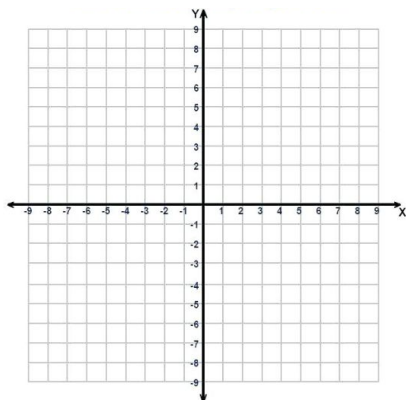
a. $f(x) = -|x + 2| - 1$

b. $y = \sqrt{x - 2} + 1$



c. $(x + 4)^2 + (y - 3)^2 = 1$

d. $y = -x^3 + 5$



10) Identify the parent graphs of each of the following relationships and describe how the graph of each equation is transformed from the parent graph.

a. $y = 0.25(x - 8)^3 + 2$

b. $(x + 3)^2 + y^2 = 25$

c. $y = |x - 5| + 3$

11) Solve each system of equations without graphing. For each case, explain what the solution tells you about the graph of the system.

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

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

12) Solve each of the following inequalities. Represent the solutions algebraically and on a number line.

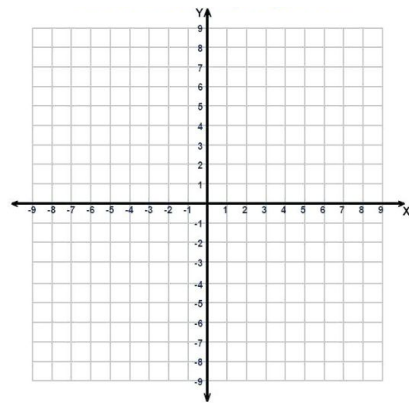
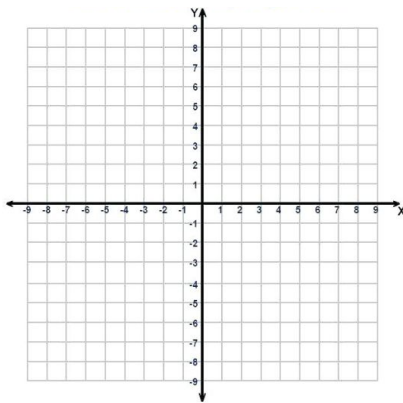
a. $2|3x - 5| \geq 4$

b. $\frac{1}{3}(3x - 6)^3 + 4 < 13$

13) Complete the square to change the following equations to graphing form. Then sketch the graph of each equation.

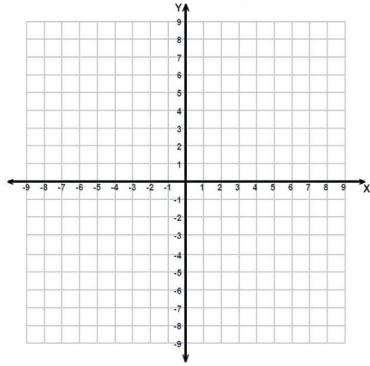
a. $y = x^2 + 4x + 6$

b. $x^2 + 6x + y^2 - 8y = 0$

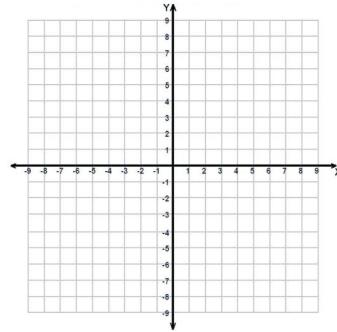


14) Graph the following systems of inequalities.

a. $y \leq 4x + 16$
 $y > -\frac{4}{3}x - 4$

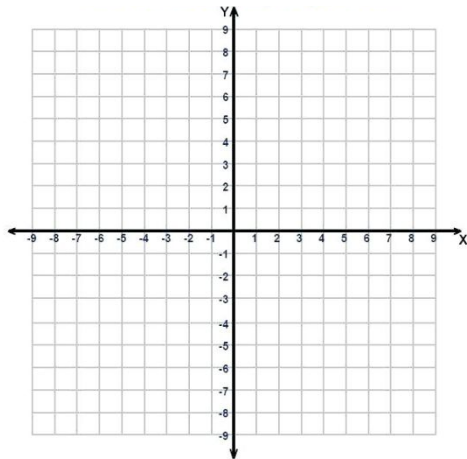


b. $y < x^2 - 2x - 3$
 $y \leq \frac{3}{4}x + 2$



15) Graph the piecewise function:

$$g(x) = \begin{cases} -x^2 + 3, & x < 1 \\ -1, & x = 1 \\ 2x, & x > 1 \end{cases}$$



- a. Evaluate $g(10)$
- b. Is $g(x)$ continuous? Explain.

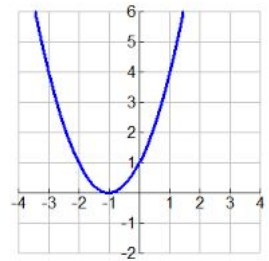
16) Decide whether each function is even, odd, or neither, and explain your reasoning.

a. $y = x^3 + x$

b. $y = 6x^2 - x$

c. $y = x^4 + 3x^2$

d.



17) How can you tell functions are inverses by looking at their graphs or tables? How are the domain and range related for a function and its inverse?

18) Write the inverse functions for the equations below.

a. $y = 3x - 2$

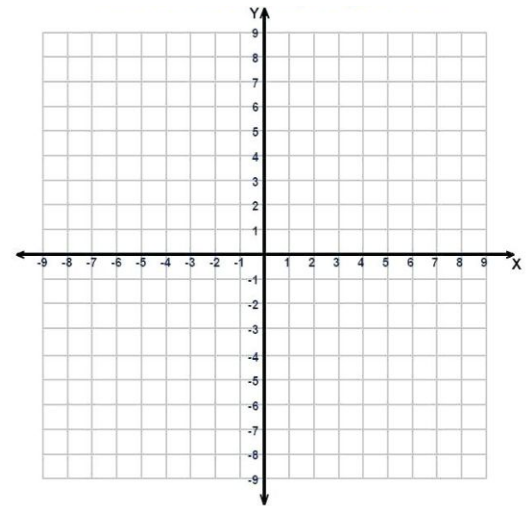
b. $y = \frac{x+1}{4}$

c. $y = x^3 + 1$

19) Given the function $f(x) = 2 + \sqrt{x-1}$

a. Make a complete graph of $y = f(x)$ and state the domain and range.

b. Determine the equation for $f^{-1}(x)$, that is, the inverse of $f(x)$.



c. Graph $f^{-1}(x)$ using the appropriate domain and range on the same axes as $f(x)$

20) Use the definition of a logarithm to solve each of the following equations *without using a calculator*.

b. $\log_8(64) = x$

b. $\log_9(x) = \frac{1}{2}$