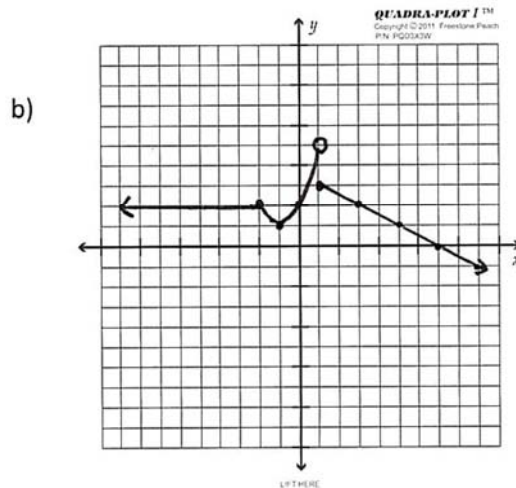
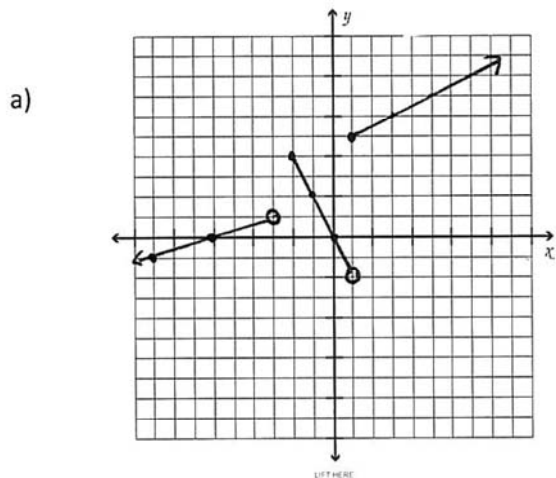


1. Write a piecewise function for each of the graphs below:

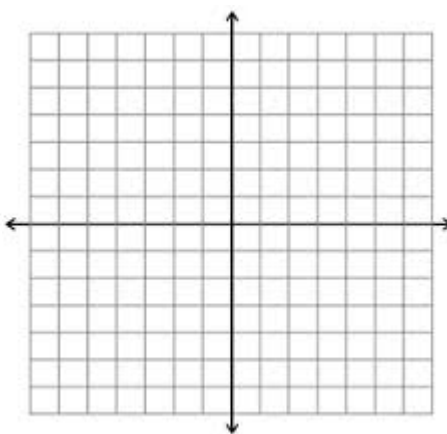
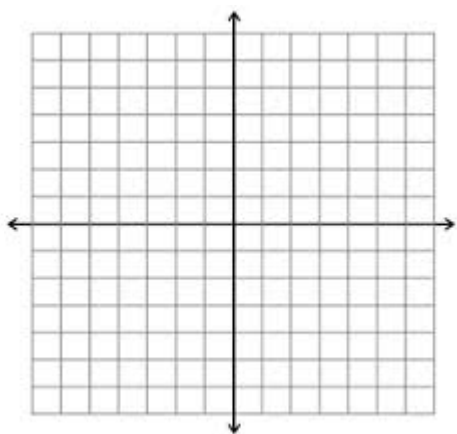
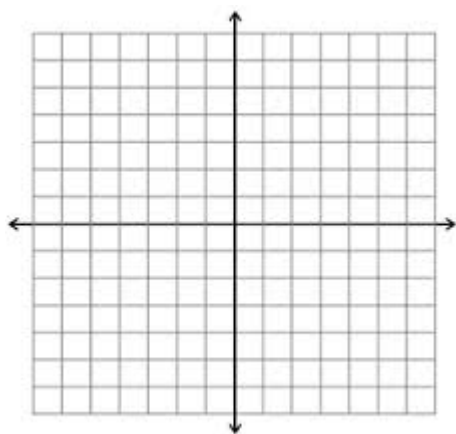


2. Use the algebraic definition of absolute value to rewrite each expression as a piecewise function and then sketch each graph.

a) $f(x) = \left| \frac{1}{3}x + 2 \right|$

b) $f(x) = |x - 1| + 2$

c) $f(x) = \frac{|x - 3|}{3 - x}$

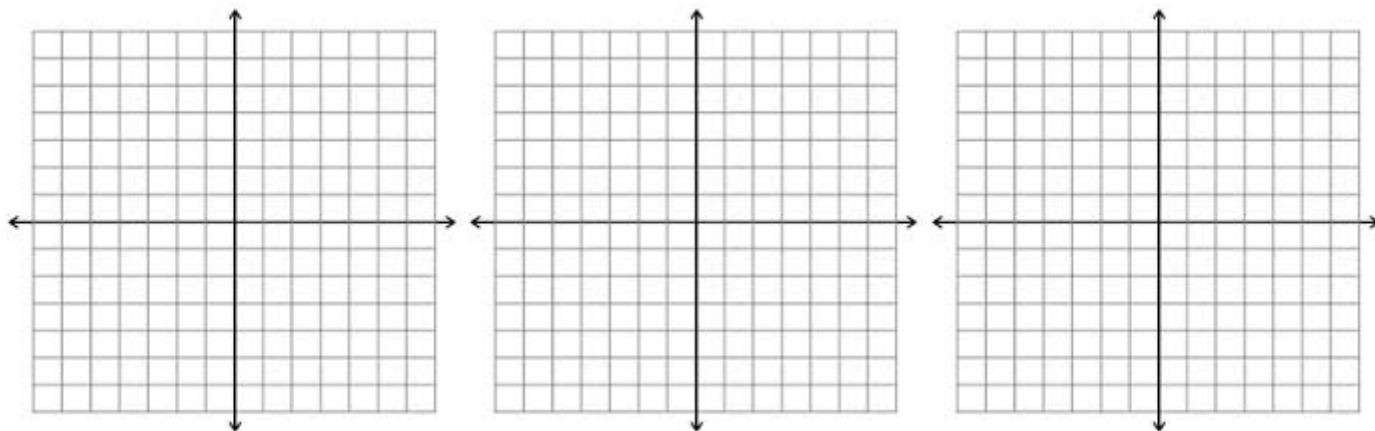


3) Describe each transformation in terms of the original function $f(x) = x^2$ then graph each function. State the domain, range, and any x- or y-intercepts

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

b) $f(x) = 3 - (x+2)^2$

c) $f(x) = x^2 + 4x - 6$

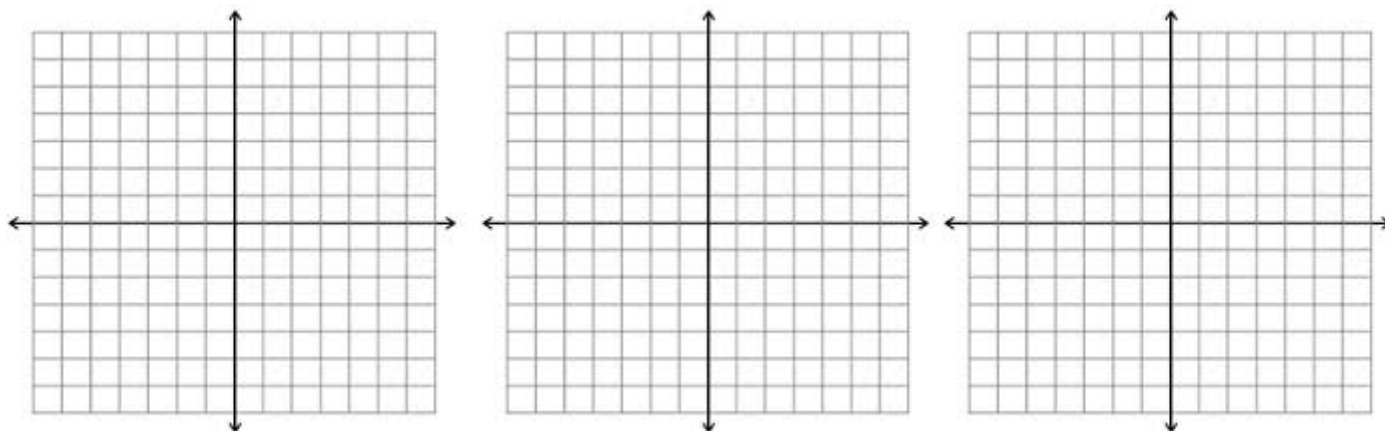


4) Describe each transformation in terms of the original function $f(x) = |x|$ then graph each function. State the domain, range, and any x- or y-intercepts.

a) $f(x) = |-x| + 3$

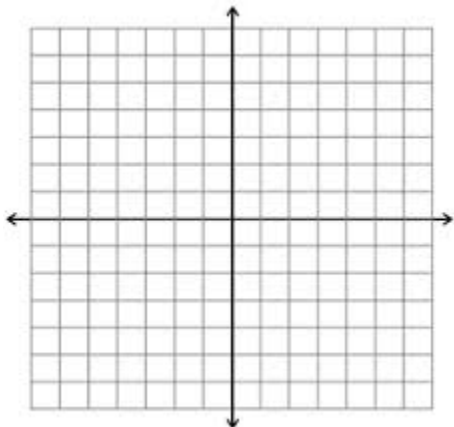
b) $f(x) = -|x+2|$

c) $f(x) = |x-2| - 1$

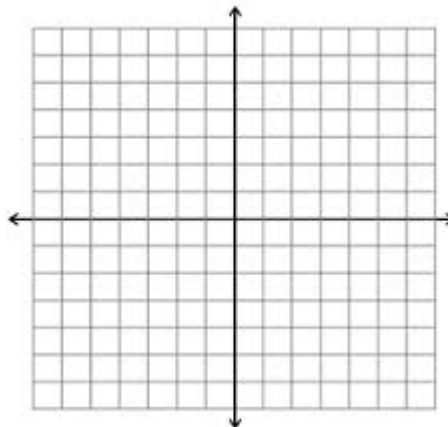


5) Describe each function in terms of the basic function $f(x) = \sqrt{x}$ then graph each function. State the domain, range, x- and y-intercepts.

a) $f(x) = -\sqrt{x+2}$

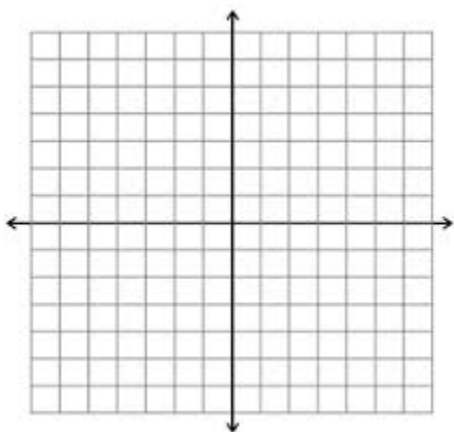


b) $f(x) = \sqrt{x-1} + 5$

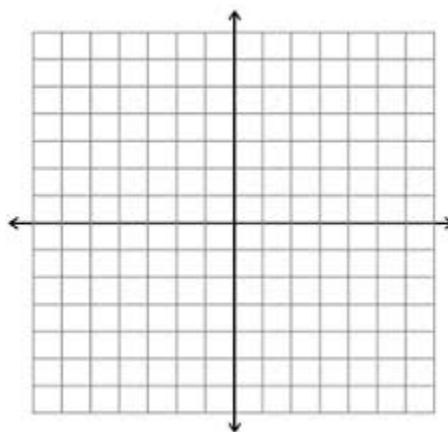


6) Graph each function as a transformation of the basic function $f(x) = x^3$. State the domain, range, x- and y-intercepts.

a) $f(x) = (x+2)^3 - 3$



b) $f(x) = (-x)^3 + 2$



7) Write an equation for the indicated transformation that is applied to the given function.

a) $f(x) = x^4$; shift 3 units to the right, reflect over the x-axis, shifted up 5 units

b) $f(x) = \sqrt{x}$; shift to the left 2, shift down 4 units

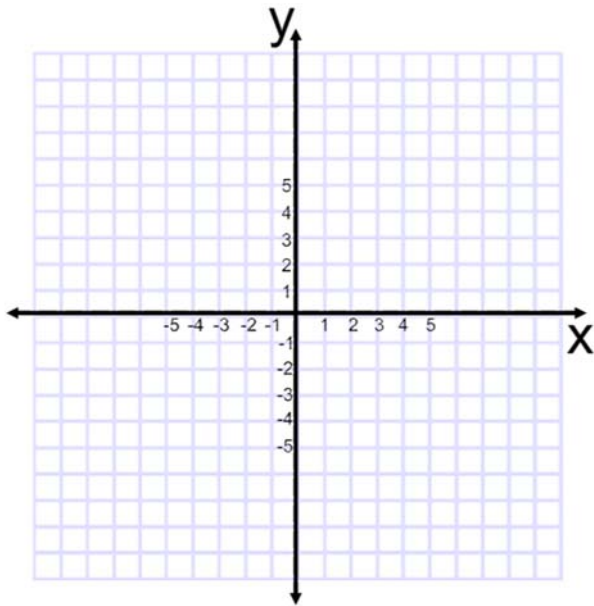
c) $f(x) = x^2$; shift to the right 4, reflected over the x-axis, shift up 2 units

d) $f(x) = x^3$; reflect over the y-axis, shifted up 3 units

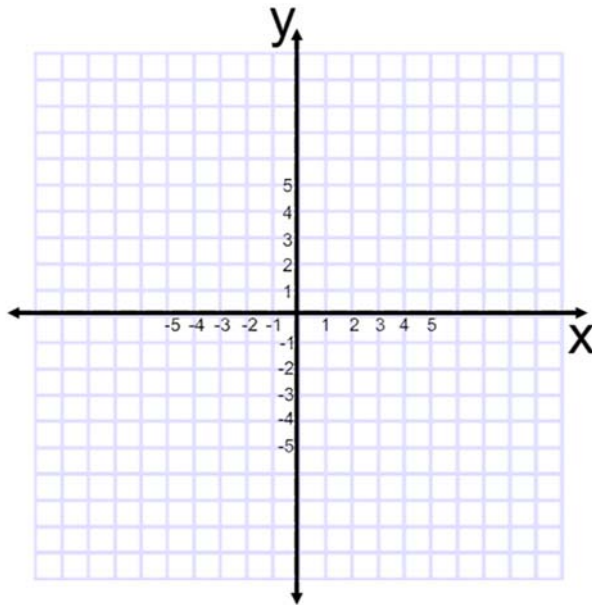
8) Write $f(x) = -x^2 + 4x - 3$ in vertex form.

9) For each, find the axis of symmetry, vertex, domain, range, x -intercepts, y -intercepts and graph it

a. $f(x) = -x^2 + 4x - 3$



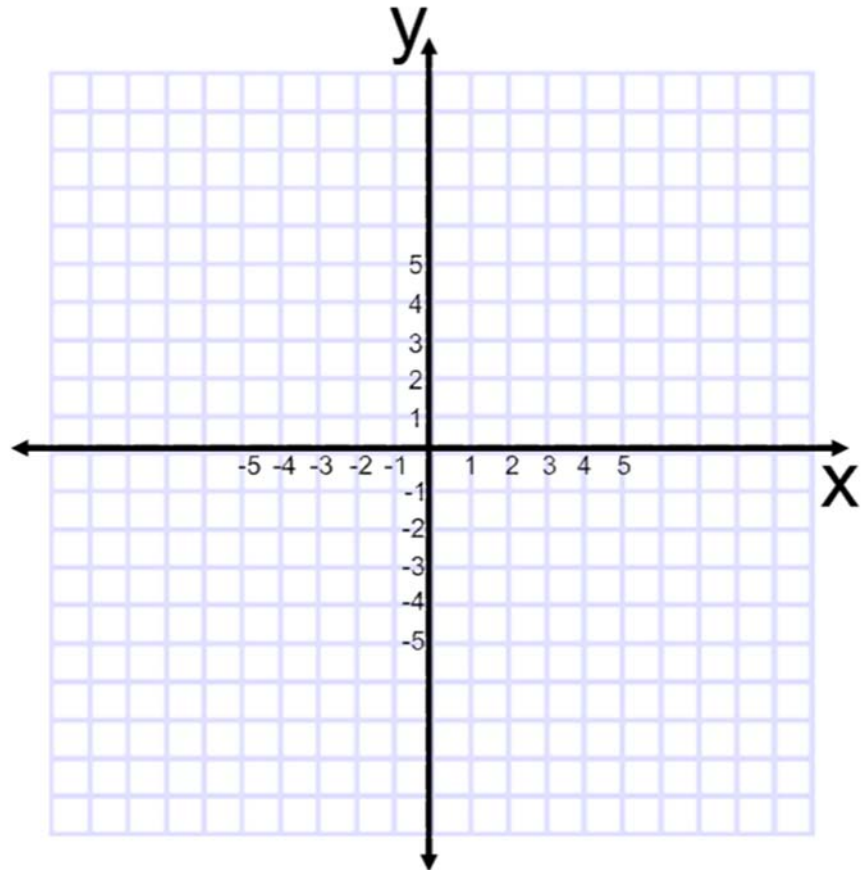
b. $f(x) = 2(x-1)^2 - 2$



10) Sketch the function **without** using a graphing calculator. Find the domain and range of each function. Evaluate the function as directed.

$$a. \quad f(x) = \begin{cases} -x^2 + 4, & x \leq 2 \\ \frac{1}{2}x - 3, & 2 < x < 4 \\ \sqrt{x-4}, & x \geq 4 \end{cases}$$

Evaluate: $f(-2) =$ $f(2) =$
 $f(-1) =$ $f(4) =$
 $f(0) =$ $f(8) =$



11) Write a piecewise function that is represented by the accompanying graph of $y = f(x)$ and evaluate.

$$f(-2) =$$

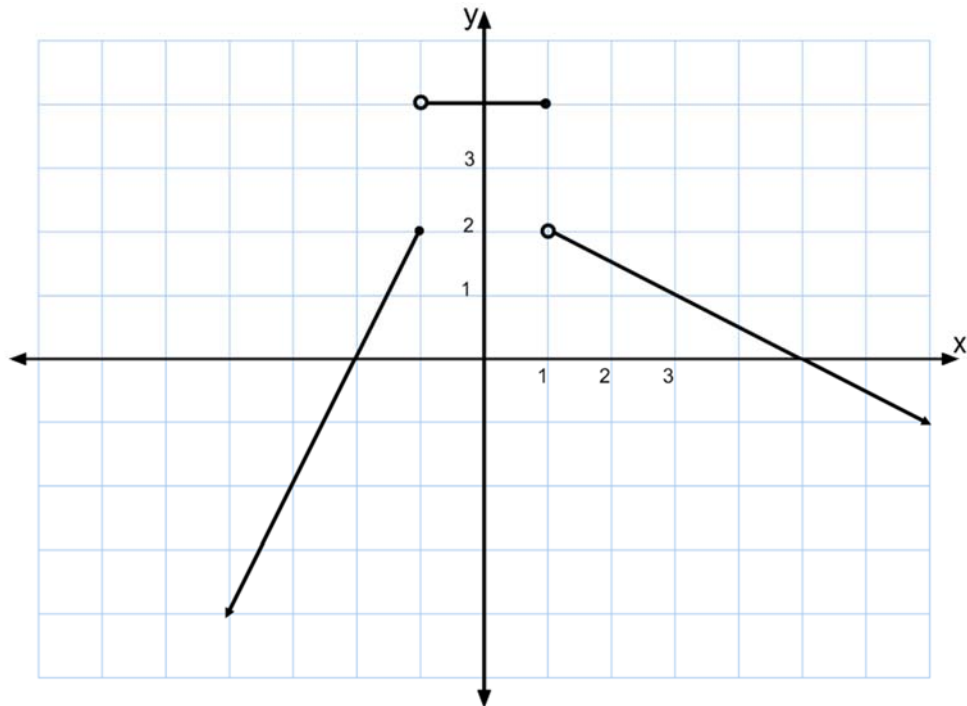
$$f(-1) =$$

$$f(0) =$$

$$f(1) =$$

$$f(3) =$$

$$f(5) =$$



12. Determine algebraically whether the following functions are even, odd, or neither

a) $f(x) = -3x^2 + 4$

b) $f(x) = 2x^3 - 4x$

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

d) $f(x) = (x - 2)^2 + 1$

13. Write an equation for the indicated transformation given the function

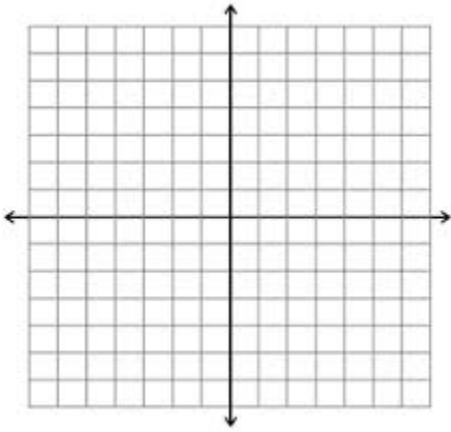
a. $f(x) = \sqrt{x}$; shift to the left 2, vertical stretch by a factor of 3, shift down 4 units

b. $f(x) = x^3$; reflect over the y-axis, horizontal stretch by a factor of 2

14. Describe each transformation in terms of the original function then graph each function. State the domain, range, and any x- or y-intercepts.

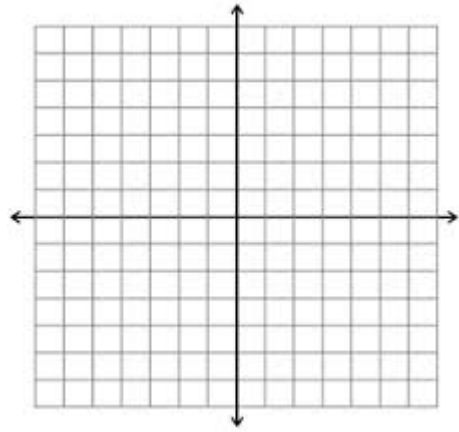
a. Original $f(x) = |x|$

$$f(x) = |2x|$$



b. Original $f(x) = x^3$

$$f(x) = \frac{1}{2}x^3$$



15. Divide the following and express the answer as a quotient plus remainder:

a) $(6x^2 - 7x - 5) \div (3x - 5)$ (synthetic)

b) $(2x^2 + 13x - 8) \div (x - 2)$ (synthetic)

c) $(3x^3 + 5x^5 + 1) \div (x + 2)$

d) $(7x^2 - 23x + 6) \div (x - 3)$ (long)

e) $(2x^4 - 3x^2 + 7x - 8) \div (x^2 + x - 3)$