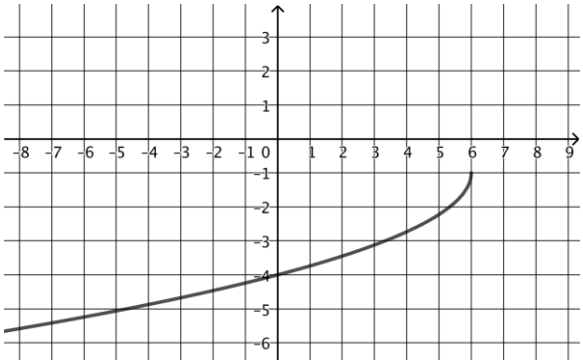
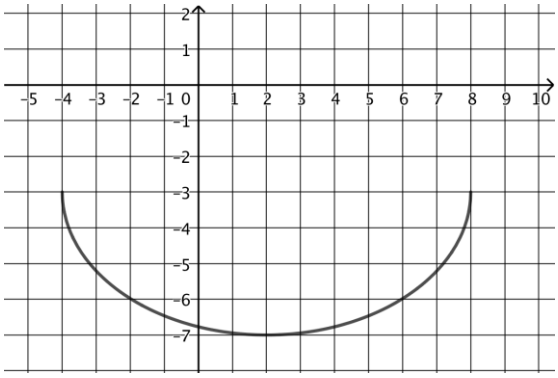
PreCalc BC Functions Review **Name:**

1. Write an equation for each transformation of a basic function shown below.





2. Given the functions $f(x) = \frac{1}{\sqrt{x+3}}$ and $g(x) = 1 - x^2$

a) Find the domain of *f(g(x))*.

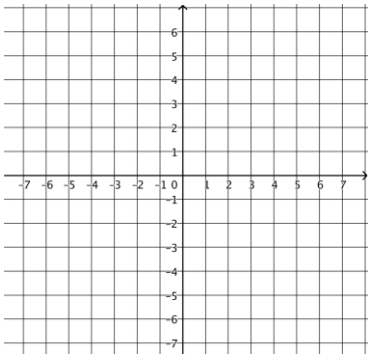
b) Find the inverse of *f(x)* with appropriate domain.

c) Describe *g(f(x))* as a transformation of a basic function.

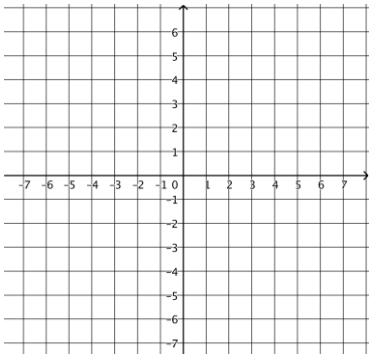
d) Find *x* such that *g(f(x))* = 1

3. Sketch each of the functions below. Then check with your calculator.

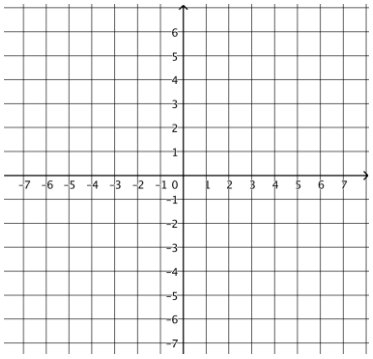
a. $y = e^{2-x} + 3$



b. $y = 2|4 - x|$



c. $y = 1 - \sqrt{2x - 4}$



4. Find the following limits:

a. $\lim_{x \to 3} \frac{x - 3}{3}$

b. $\lim_{x \to -1} \frac{x + 1}{2x + 2}$

c. $\lim_{x \to \infty} \frac{4x + 1}{2x + 2}$

d. $\lim_{x \to 3} \begin{cases} x^2 - 4, & x < 3 \\ 7, & x = 3 \\ x + 2, & x > 3 \end{cases}$

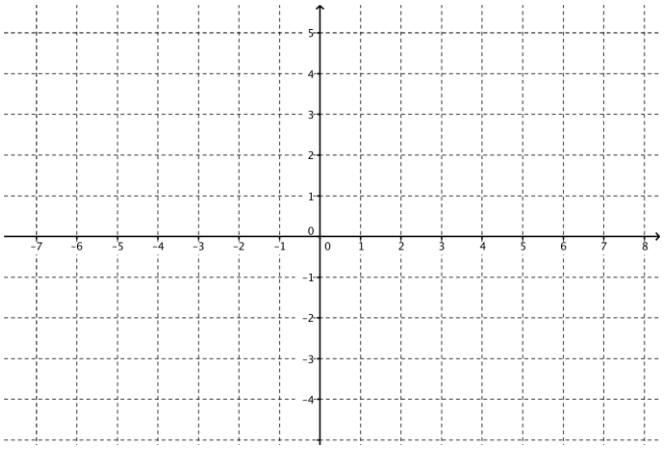
5. Chose a function from your “library” that satisfies the following conditions -- no fair looking at your library while you do this.

a) Bounded below, but no extrema

b) Odd symmetry, restricted domain

c) Continuous, odd symmetry, restricted range

6. Analyze the following function, then sketch: $y = \dfrac{x^2 - 1}{(x - 3)^2}$



7.

a) Can a function that has a discontinuity still have a limit that exists for each value of x in the domain?

b) Must a continuous function with odd symmetry pass through the origin?

c) What is the symmetry of a composition of an even and an odd function? Does the order in which they are composed matter?

d) Which of the following attributes are always unchanged by a vertical dilation?

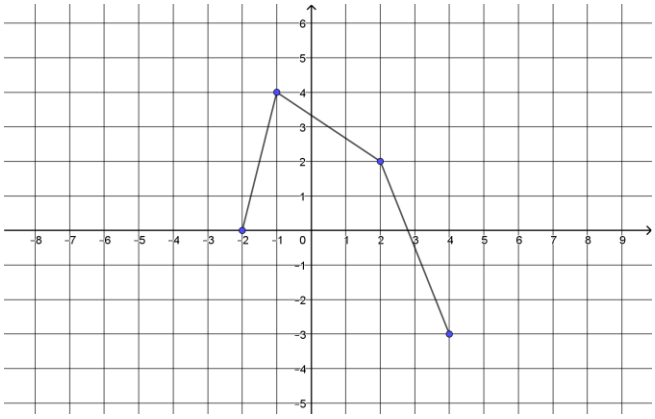
x-intcpts, y-intcpt, symmetry, domain, range, vertical asymptotes

e) Same as previous question but for a reflection over the y-axis?

x-intcpts, y-intcpt, symmetry, domain, range, vertical asymptotes

8. Sketch a function with domain $x > 0$ such that $f(x) > 0$ for all values of x, $f(x)$ is *decreasing* for all values of x, $f(x)$ is concave up for all values of x and $f(x) = f^{-1}(x)$. Or explain why such a function is impossible.

9. Given the function *f*(x) at right, sketch $y = 2 - f\left(\frac{1}{2}x + 2\right)$



10. Write a function that corresponds to the graph at right.