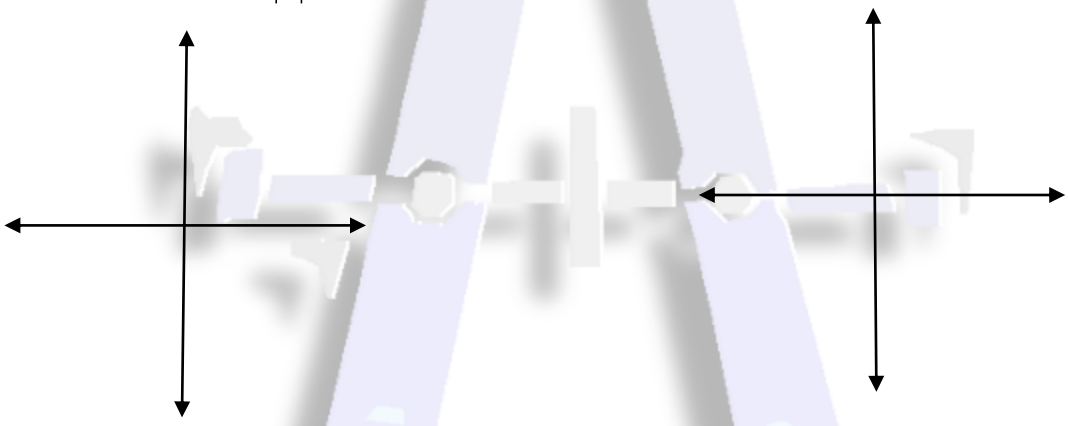
Name _____

Homework #0, Math 151, Fall 2008

Instructions: Record final answers and attach pages with work. All work must be shown in order to receive credit. Exact values should be use unless stated otherwise.

1. Given the equations below, find the following for each equation:
   a. Is it a function? If so, write it in function notation.
   b. What is its domain?
   c. What is its range? [Hint: sketching a graph may help, or inverse function methods.]
   d. Find any intercepts (x & y).
   e. Test for symmetry (x-axis, y-axis, origin).
   f. Sketch the graph by plotting points (at least six, may require more)
      i. $xy - \sqrt{4 - x^2} = 0$
      ii. $|y| - x = 3$



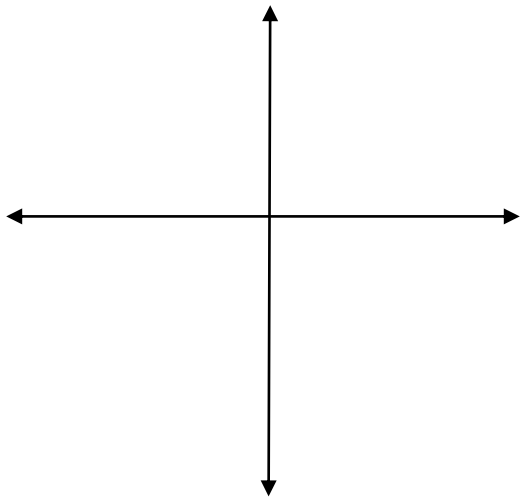
2. Solve the system of equations. Compare your algebraic and graphical results.
   a. $\begin{cases} 2x - 3y = 13 \\ 5x + 3y = 1 \end{cases}$

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

3. Find the equation of the line connecting the points (-3,-4) and (1,4).

4. Evaluate the function for the specified values. $f(x) = x^3 - x$
   a. f(1) b. f(-3) c. f(t-1) d. $\frac{f(x) - f(1)}{x - 1}$

5. Sketch $f(x)=\begin{cases}\sqrt{x+4}, & x\le 5\\ x-5^{\,2}, & x>5\end{cases}$. Plot points $x=n\,|\,0\le n\le 8$ and label them on the graph.



6. Apply the following transformations to the functions $f(x)=x^2$. Write the new equation in each case. For each part, apply only the transformation stated in that part.
   a. Shift down 3 units

   b. Shift left 4 units

   c. Compress the graph (in y) by a factor of your choosing.

   d. Reflect the graph.

   e. All of the above in the same graph.

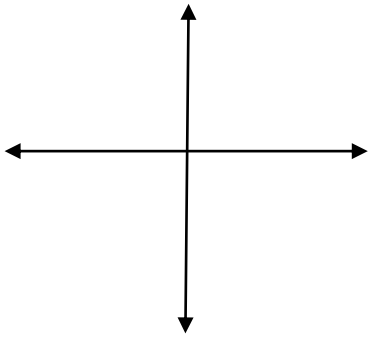
7. For $f(x)=\sqrt{x}+1,\quad g(x)=4x+x^2,\quad h(x)=\sin(x)$ find
   a. $f\circ g$

   b. $g\circ h$

   c. $g\circ g$

   d. $g\circ f\circ h$

8. Find the inverse function of $f(x) = \frac{x+2}{x}$.
   a. Does the domain of f need to be restricted for an inverse function to exist?
   b. State the domain and range of f.
   c. Sketch the equation and its inverse on the same graph.
   d. Find $f \circ f^{-1}$



9. Solve for x.
   a. $18^2 = 5x - 7^{\ 2}$
   b. $x + 3^{\ 4/3} = 16$

10. Give the domain and range of the following functions.
   a. $f(x) = e^x$
   b. $g(x) = 3e^{-2x} - 1$
   c. $h(x) = \ln(x)$
   d. $k(x) = -\ln(x-1)$
   e. $m(x) = \ln\left(\frac{1}{x-1}\right)$