Math 130 Precalculus Fall 14 Sample midterm 1

1. Find the domain of the following functions.

   (a) $f(x) = \sqrt{x^2 - 2x - 15}$

   (b) $f(x) = \sqrt{\dfrac{x+1}{x-3}}$

2. Let $f(x) = \sqrt{x+3}$ and $g(x) = \dfrac{1}{2-x^2}$. Find:

   (a) The domain of $f + g$.

   (b) $(f+g)(1)$

   (c) $(f-g)(6)$

   (d) $(fg)(0)$

   (e) $(f/g)(1)$.

   (f) $(f \circ g)(x)$

   (g) $(g \circ g)(x)$.

3. For the given quadratic functions, convert them into the form $a((x+h)^2 + k)$. Find the absolute maximum or minimum.

   (a) $f(x) = x^2 + 4x + 5$

   (b) $f(x) = 2x^2 + 4x + 4$

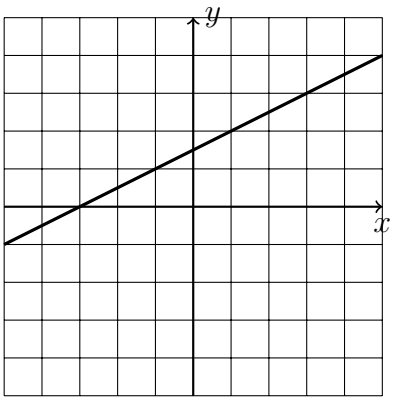
4. Find the values of x for which the following inequalities are true.

   (a) $x^2 - 7x + 12 \geq 0$

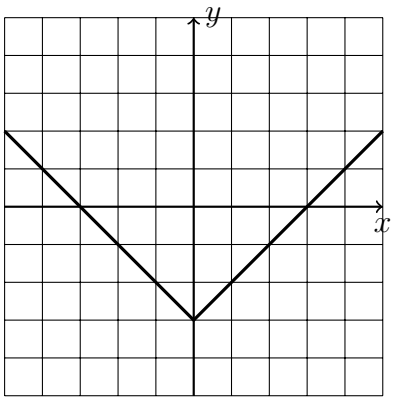
   (b) $\dfrac{x+1}{x-4} > 2$

   (c) $|2x - 6| > 1$

5. Sketch the graph of the function $f(x) = x^2 + x - 2$, showing where it hits the x- and y-axes. What is the average rate of change of the function between $x = 1$ and $x = 3$? Draw the line representing this average rate of change on your graph.



$f(x)$



$g(x)$

6. Consider the two functions f and g whose graphs are shown above. Draw pictures of:

   (a) $f + g$
   (b) fg
   (c) $g(2x)$
   (d) $2f(x) - 2$
   (e) $-g(x)$
   (f) $f(-x) - 2$

7. Consider the two functions f and g whose graphs are shown above. Find:

   (a) $f(g(2))$
   (b) $(g \circ f)(-1)$
   (c) $f(g(g(1)))$
   (d) Does f have an inverse? Explain. If it does, find $f^{-1}(3)$.
   (e) Does g have an inverse? Explain. If it does, find $g^{-1}(-2)$.
   (f) Are either of f or g even or odd? Explain.

8. A farmer wishes to mark out two rectangular fields of equal dimensions beside a road. If he has 600ft of fencing, what is the largest area of the combined fields?