MATH 125
SPRING 2014 NAME:
EXAM 1

1. [10 pts. each] Consider the points $(-2, 5)$ and $(-6, -1)$.
   (a) Find the exact distance between the two points.
   (b) Find the midpoint of the segment joining the two points.

2. [10 pts.] Find the equation of the circle with center $(-4, 2)$ and diameter of length 3.

3. [10 pts.] Find the slope and intercepts of the line given by $2x - 5y = 1$, then graph the line.

4. [10 pts.] Given $f(x) = -x^2 + 3x - 2$, find $f(0)$, $f(4)$, and $f(-x)$.

5. [10 pts. each] Find the domain of the function in interval notation.
   (a) $f(x) = \dfrac{2x - 5}{x^2 - 25}$
   (b) $g(x) = \sqrt{4 - 3x}$
   (c) $h(x) = \dfrac{\sqrt{x + 4}}{x - 8}$

6. [10 pts. each] Refer to the functions f, g, and h in Problem 5.
   (a) Find fg and its domain.
   (b) Find h/f and its domain.
   (c) Find $g \circ g$ and its domain.

7. [10 pts. each] Let $F(x) = \sqrt{x + 5}$ and $G(x) = x^2 - 5$.
   (a) Find $F \circ G$ and its domain.
   (b) Find $G \circ F$ and its domain.

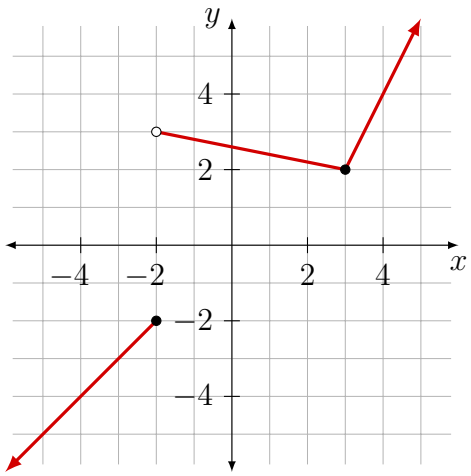
8. [10 pts.] Let $h = \dfrac{1}{\sqrt{3x + 7}}$. Find f and g such that $f \neq h$, $g \neq h$, and $f \circ g = h$.

9. [10 pts.] Given the piecewise-defined function

$$\psi(x) = \begin{cases} 3x + 11, & \text{for } x \leq -5 \\ 1, & \text{for } -5 < x \leq 1 \\ x + 2, & \text{for } x > 1 \end{cases}$$

   find $\psi(-5)$, $\psi(0)$, $\psi(1)$, and $\psi(3)$.

10. [10 pts. each] Let H be the function with the following graph:



(a) Find the domain and range of H.

(b) Write an equation for H.

11. [10 pts.] Determine algebraically if the graph of $y^3 = 2x^2$ is symmetric with respect to the x-axis, the y-axis, or the origin.

12. [10 pts.] Write an equation for the function whose graph has the shape of $y = \sqrt{x}$, but shifted right 9 units and up 4 units.