Math 115 **Worksheet 6** **September 15, 2014**

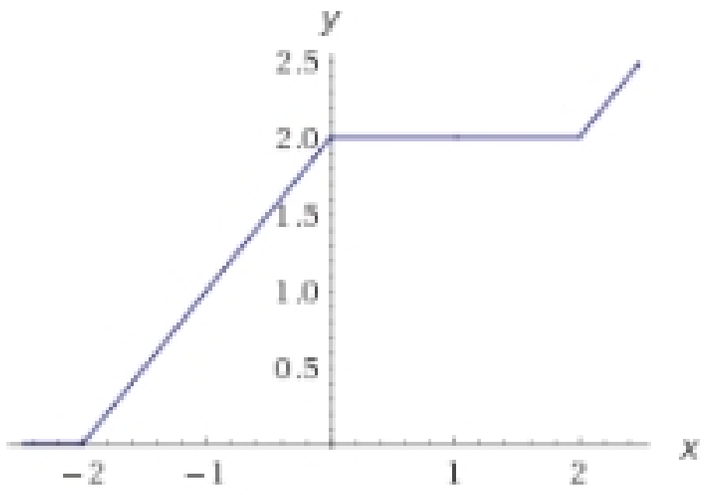
Name _____
Group Members:

1. Find the average rate of change of the following functions in the given range

   (a) $f(x) = x^2 + 3x$ from -2 to 0

   (b) $g(x) = \begin{cases} x^2 & x < 0 \\ x^3 & x \geq 0 \end{cases}$ from -1 to 3

   (c) the function below from -1 to 1



2. Define the function from problem 1c on the interval $[-2, 3]$.

3. Determine whether the functions are even, odd, or neither.

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

   (b) $g(t) = 3t^4 + 1$

   (c) $h(x) = 3x^5 - x + 1$

4. Let $f(x) = 3x - 2$. Let A be the point $(4, 0)$

   (a) Give the equation of a line parallel to f.

   (b) Give the equation of a line parallel to f that goes through the point A.

   (c) Give the equation of a line perpendicular to f that goes through the point A.

   (d) Find the equation of a line perpendicular to the line $x = 2$ that goes through the point $(-1, 3)$.

   (e) Find the equation of a line that goes through the points A and $(-5, -1)$.

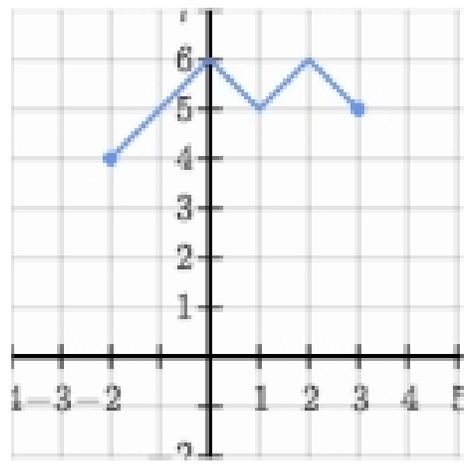
5. If the lines $4y + 2x = -5$ and $3y + ax = -2$ are perpendicular, what is the value of a?

6. After purchasing an autographed baseball card for \$85, its value increases by \$1.50 per year.

   (a) What is the card's value 7 years after purchase?

(b) How many years will it take for this card's value to reach \$100?

7. The graph of f is given at right



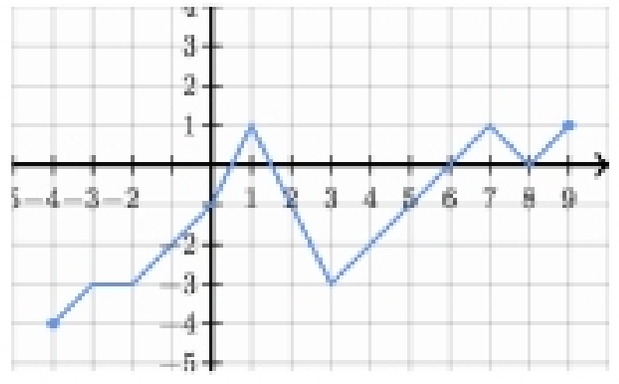
   (a) Find the domain of f.

   (b) Find the range of f.

   (c) For which x is $f(x) < 5$?

   (d) For which x is $f(x) = 6$?

8. The graph of g is given at right



   (a) Find the domain of g.

   (b) Find the range of g.

   (c) For which x is $g(x) > 0$?

   (d) For which x is $g(x) = -2$?

9. Given that $f(x) = \sqrt{x-4}$ and $g(x) = \frac{2}{3x+2}$

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

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

   (c) Find $(g \circ g)(x)$

   (d) Find $(f+g)(5)$

10. Given $h(x) = (\sqrt[3]{x}+1)^2 - 3$, identify two functions f and g so that $(f \circ g)(x) = h(x)$, then check your answer.

11. Carefully graph the following functions, giving the domain and range in interval notation.

   (a) $g(x) = |2x+3|$

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

   (c) $h(x) = -3x^2 - 1$

   (d) $h(x) = 3(x-1)^2$

   (e) $k(x) = -\sqrt{x+4}$

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

   (g) $\ell(x) = 5\sqrt[3]{x-3}$