## **Conceptual Problems**

Please provide a short explanation for your answers.

1. (3 points) True or False? It is possible for an odd function to have  $[0, \infty)$  as its domain.

2. (3 points) True or False? It is possible for two lines with positive slope to be perpendicular.

**3.** (3 points) Write down the formula for the slope of a line passing through the points  $(x_1, y_1)$  and  $(x_2, y_2)$ . Explain why the slope of a vertical line is said to be undefined and why the slope of a horizontal line is zero.

## **Computational Problems**

Please show your work.

4. (6 points) Consider the piecewise function defined below. Find f(-9), f(-1),  $f(\frac{3}{2})$ ,  $f(-\frac{1}{2})$ ,  $f(\frac{1}{2})$ , and f(6).

$$f(x) = \begin{cases} x^2 & x \le -1 \\ -x & -1 \le x \le 0 \\ x & 0 \le x \le 1 \\ x^2 & x \ge 1 \end{cases}$$

5. (4 points) Rationalize the denominator of the expression. Simplify your answer.

 $\frac{3}{\sqrt{5}-\sqrt{8}}$ 

6. (4 points) Let  $f(x) = \sqrt{x-2}$  and  $g(x) = \frac{1}{x-3}$ .

a. Find the domain of f(x).

b. Find the domain of the composition  $(g \circ f)(x)$ .

Test 1

7. (4 points) Find the equation (in standard form) of the linear function passing through the point (1, -1) and perpendicular to the line graphed below.



8. (4 points) Please draw the graph of the function g(x) = -2|x-2| + 1.

**9.** (4 points) Let  $f(x) = (2x - 1)^2 - 12x^2 + 20x - 11$  and assume  $f(x) = (g \circ h)(x)$  where h(x) = 2x. Find the function g(x).