MATH 125
FALL 2015
EXAM 1

NAME:

1. [10 pts.] Find $f(-1)$ and $f(2x)$, given that

$$f(x) = 1 - \frac{1}{x^2+1}.$$

2. [10 pts. each] Find the domain of each function.

(a) $g(x) = \dfrac{4}{\sqrt{x-16}}$

(b) $h(t) = \dfrac{\sqrt{t+3}}{t-2}$

3. [10 pts. each] Let

$$f(x) = 1 + \frac{1}{x} \quad \text{and} \quad g(x) = \frac{1}{x}.$$

(a) Find $(f-g)(x)$ and its domain.

(b) Find $\left(\dfrac{f}{g}\right)(x)$ and its domain.

4. [3 pts. each] Let $p(x) = -3x^2 + 5x$.

(a) Is the point $(-1, 2)$ on the graph of p?

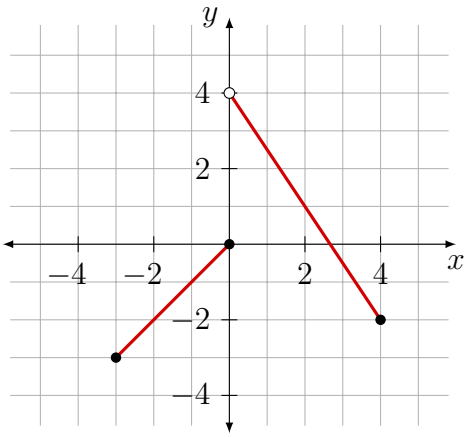
(b) Find x if $p(x) = -2$.

(c) Find the domain of p.

(d) Find the y-intercept of p.

(e) What are the zeros of p?

5. [10 pts.] A piecewise-defined function f has graph below. Write a definition for f.



6. [10 pts.] Let $P = (x, y)$ be a point on the graph of $y = x^2 - 8$. Express the distance d from P to the origin as a function of x.

7. [10 pts.] Find the points of intersection of the graphs of the functions

$$f(x) = x^2 + 5x - 3 \quad \text{and} \quad g(x) = 2x^2 + 7x - 27.$$

8. [10 pts. each] Consider the quadratic function $q(x) = x^2 - 6x - 9$.

   (a) Find the zeros of q by completing the square.

   (b) Determine the domain and range of the q.

9. [10 pts. each] Let $f(x) = -x^2 + 4$ and $g(x) = -x - 2$.

   (a) Solve $f(x) \geq 1$.

   (b) Solve $f(x) > g(x)$.

10. [15 pts.] Rom has 3000 meters of fencing on hand to enclose a rectangular field. Express the area A of the rectangle as a function x, where x is the length of the rectangle. Find the value of x for which the area is greatest, and then find the maximum area.