MATH 125
SPRING 2022 NAME:
EXAM 1

1. [10 pts.] Find $f(-3)$ and $f(x-2)$ for

$$f(x) = 1 - \frac{45}{x^2+6}.$$

2. [10 pts. each] Give the domain of each function in interval notation.

(a) $\ell(x) = \dfrac{x+9}{x^2+3x+2}$

(b) $u(t) = \dfrac{t}{\sqrt{t+8}}$

3. [10 pts.] Find $\left(\dfrac{f}{g}\right)(x)$ and its domain, given that

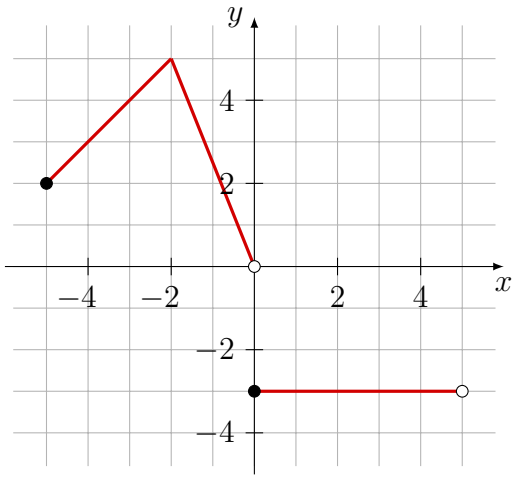
$$f(x) = 2 - \frac{1}{x-9} \quad \text{and} \quad g(x) = \frac{\sqrt{x}}{x-1}.$$

4. [10 pts.] If

$$f(x) = \frac{2x+1}{3x-c}$$

and $f(2) = -1$, what is the value of c?

5. [15 pts.] A piecewise-defined function f has graph below. Write a definition for f, and find the domain and range of f.



6. [10 pts.] Find the function f that is finally graphed after all the following transformations are applied to the graph of $y = x^2$ in the order indicated: (1) Shift right 3 units; (2) Reflect about y-axis; (3) Shift down 4 units.

7. [15 pts.] A rectangle has one vertex in Quadrant I on the graph of $y = 10 - x^2$, one at the origin, one on the positive x-axis, and another on the positive y-axis. Express the area A of the rectangle as a function of x. What is the domain of the function A?

8. [10 pts.] Find the real zeros of

$$p(x) = 2x^2 + 5x + 3$$

by completing the square

9. [10 pts.] Find the real zeros of

$$u(x) = x^4 - 10x^2 + 24.$$

10. [10 pts.] Find the vertex of the parabola given by

$$f(x) = 3x^2 + 2x + 5.$$

What is the domain, range, and axis of symmetry of the function?