

1. 10 pts. Find $f(-4)$ and $f(x + 3)$ for

$$f(x) = 1 - \frac{1}{(x + 5)^2}.$$

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

(a) $A(x) = \frac{x + 9}{x^3 - 4x}$

(b) $p(z) = \frac{-z}{\sqrt{-z - 2}}$

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

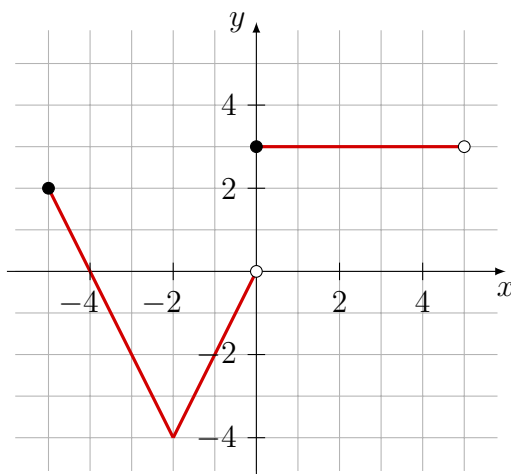
$$f(x) = 2 - \frac{1}{x - 9} \quad \text{and} \quad g(x) = \frac{\sqrt{x}}{x - 1}.$$

4. 10 pts. If

$$f(x) = \frac{2x + c}{3x + 4}$$

and $f(2) = \frac{1}{2}$, 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 $y = \sqrt{x}$ 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

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

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

11. 10 pts. Solve the inequality $x^2 + 7x < -12$, giving the solution set in interval notation.