

1. 10 pts. Find $f(-3)$ and $f(x+1)$ for $f(x) = \sqrt{x^2 + x}$.
2. 10 pts. each Give the domain of each function in interval notation.

(a) $\kappa(x) = \sqrt{\frac{-2}{1-x}}$

(b) $V(r) = \frac{\sqrt{r}}{r-8}$

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

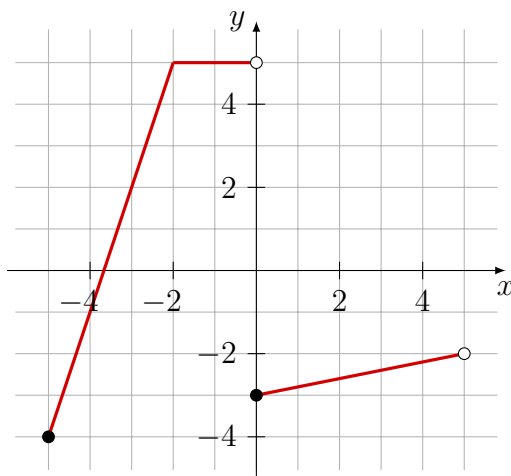
$$f(x) = \frac{1}{x-3} \quad \text{and} \quad g(x) = -\frac{\sqrt{2x}}{x-6}.$$

4. 10 pts. If

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

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) Reflect about y -axis; (2) Shift right 3 units; (3) Shift down 12 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

$$p(x) = 2x^2 - 3x - 1$$

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

$$f(x) = -2x^2 + 2x + 1.$$

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