

Evaluate the following functions:

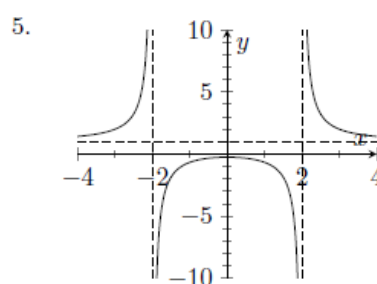
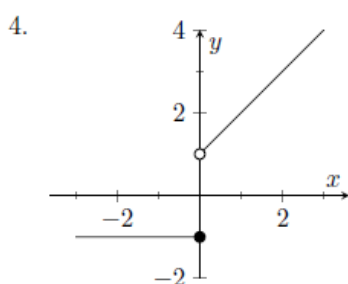
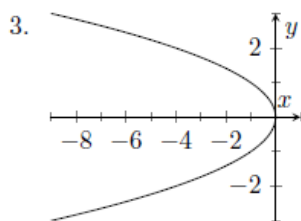
1. If  $f(x) = x^2 - 2x + 1$ , find

- (a)  $f(2)$
- (b)  $f(\sqrt{5})$
- (c)  $f(-1 + \sqrt{2})$
- (d)  $f(2w + 1)$

2. If  $f(x) = \sqrt{x + 4}$ , find

- (a)  $f(-1)$
- (b)  $f(a)$
- (c)  $f(x + h)$
- (d)  $f(\odot)$

Determine which of the curves are graphs of functions. For the graphs that are functions, find the domain and range.



Find the domain and range of each function.

6.  $f(x) = 2x + 1$

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

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

9.  $f(x) = \frac{x}{x - 1}$

10.  $f(x) = \sqrt{1 - x}$

11.  $f(x) = \sqrt{x^2 - 9}$

12.  $f(x) = \sqrt{\frac{x-2}{x-1}}$

13.  $f(x) = \sqrt{x^2 - x - 2}$

14.  $f(x) = \begin{cases} x^3, & \text{if } x \geq 0 \\ -2x, & \text{if } x < 0. \end{cases}$

Find  $f + g$ ,  $f - g$ ,  $f \cdot g$ , and  $f/g$ .

15.  $f(x) = \frac{1}{x}$ ;  $g(x) = \frac{x}{x-2}$

16.  $f(x) = \sqrt{x+1}$ ;  $g(x) = \sqrt{3-x}$

Find  $f \circ g$  and  $g \circ f$ .

17.  $f(x) = \sqrt{x-1}$ ;  $g(x) = x^2 - 3$

18.  $f(x) = \frac{1}{x}$ ;  $g(x) = \frac{1}{x+1}$

## Answers

- (a) 1  
(b)  $6 - 2\sqrt{5}$   
(c)  $6 - 4\sqrt{2}$   
(d)  $4w^2$
- (a)  $\sqrt{3}$   
(b)  $\sqrt{a+4}$   
(c)  $\sqrt{x+h+4}$   
(d)  $\sqrt{c+4}$
- Not a function
- Is a function. Domain:  $(-\infty, \infty)$ , Range:  $\{-1\} \cup (1, \infty)$
- Is a function. Domain:  $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$ , Range:  $(-\infty, 0) \cup (1, \infty)$ .
- Domain:  $(-\infty, \infty)$ , Range:  $(-\infty, \infty)$
- Domain:  $(-\infty, \infty)$ , Range:  $[-2, \infty)$
- Domain:  $(-\infty, \infty)$ , Range:  $[0, 1)$
- Domain:  $(-\infty, 1) \cup (1, \infty)$ , Range:  $(-\infty, 1) \cup (1, \infty)$
- Domain:  $(-\infty, 1]$ , Range:  $[0, \infty)$
- Domain:  $(-\infty, -3] \cup [3, \infty)$ , Range:  $[0, \infty)$
- Domain:  $(-\infty, 1) \cup (2, \infty)$ , Range:  $[0, 1) \cup (1, \infty)$
- Domain:  $(-\infty, -1] \cup [2, \infty)$ , Range:  $[0, \infty)$
- Domain:  $(-\infty, \infty)$ , Range:  $[0, \infty)$
- $(f+g)(x) = \frac{1}{x} + \frac{x}{x-2}$ ;  $(f-g)(x) = \frac{1}{x} - \frac{x}{x-2}$ ;  $(f \cdot g)(x) = \frac{1}{x-2}$ ;  $(f/g)(x) = \frac{x-2}{x^2}$
- $(f+g)(x) = \sqrt{x+1} + \sqrt{3-x}$ ;  $(f-g)(x) = \sqrt{x+1} - \sqrt{3-x}$ ;  $(f \cdot g)(x) = \sqrt{3+2x-x^2}$ ;  $(f/g)(x) = \frac{\sqrt{x+1}}{\sqrt{3-x}}$
- $(f \circ g)(x) = \sqrt{x^2-4}$ ,  $(g \circ f)(x) = x-4$
- $(f \circ g)(x) = x+1$ ,  $(g \circ f)(x) = \frac{x}{x+1}$