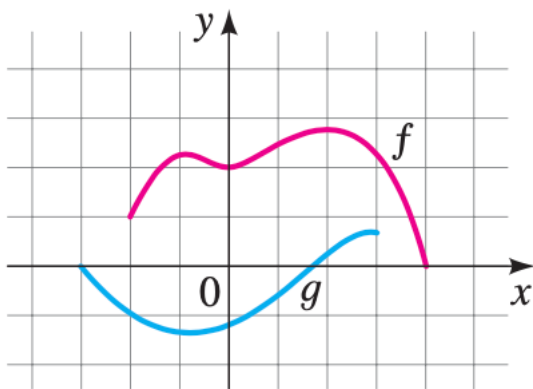


Show your work for full credits.

1. Let domain of  $f(x) = \sqrt{x^2 - 4x}$  be  $4 \leq x \leq 10$ . Find the range of the function algebraically.

2. Evaluate the given expression. (You can approximate the values from the graphs.)



- a.  $f(g(1))$
- b.  $(fg)(0)$
- c.  $(f + g)(2)$
- d.  $\left(\frac{f}{g}\right)(4)$

Let  $f(x) = \sqrt{4-x}$  and  $g(x) = x^2 + 2x$ .

3. Find domain and range of  $y = f(x)$  and  $y = g(x)$ .

4. Find domain of

a.  $f + g$

b.  $f/g$

5. Find domain and range of  $f \circ g$ .

6. Find domain and range of  $g \circ f$ .

7. Let  $f(3x + 1) = 3x^2 - 2x$ .

a. Find  $f(x)$ .

b. Find the value of  $f(10)$ .

8. The function  $f$  is defined for positive integers  $n$  by:

$$f(n) = \begin{cases} n - 1, & \text{if } n \text{ is odd} \\ \frac{n}{2} + 1, & \text{if } n \text{ is even} \end{cases}$$

Suppose  $f(f(k)) = 10$ . Find the largest possible value of  $k$ .

9. Let  $f(x) = ax^7 + bx + 3$ , where  $a, b$ , and  $c$  are constants. Suppose that  $f(5) = -3$ .  
What is  $f(-5)$ ?

10. Let  $y = f(x)$  has domain of  $[-2, 5]$  and range of  $[0, 10]$ . State domain and range of

a.  $y = 2f(x)$

b.  $y = f\left(\frac{x}{2}\right)$