

## Tutorial 1 (week 1)

### Exercise 0.2

5. If  $f(x) = 2x^3 - x$ , find  $f(-1)$ ,  $f(0)$ ,  $f(x^2)$ ,  $f(\sqrt{x})$ , and  $f\left(\frac{1}{x}\right)$ .

7. If  $f(x) = \begin{cases} x^2 + 1 & \text{if } x \leq 0 \\ \sqrt{x} & \text{if } x > 0 \end{cases}$

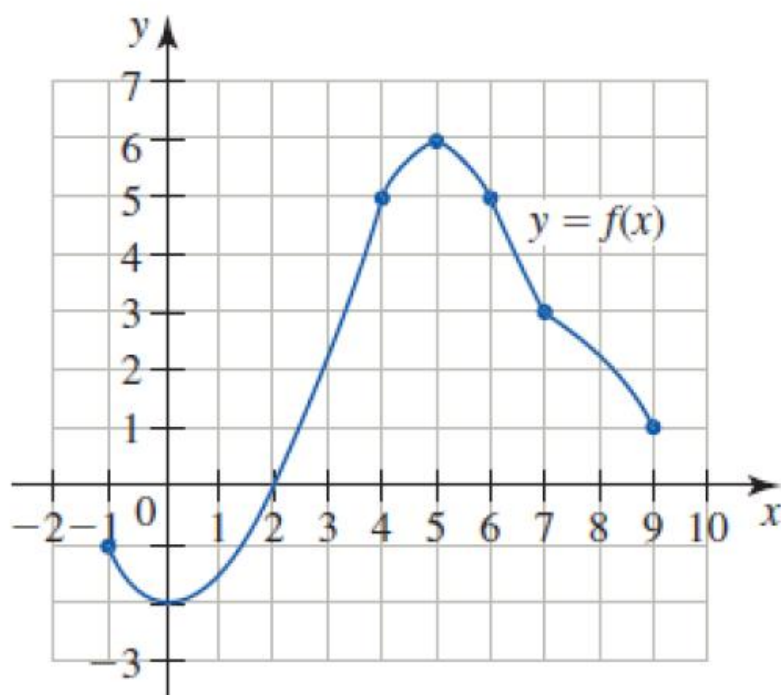
find  $f(-2)$ ,  $f(0)$ , and  $f(1)$ .

*In Exercise 15-26, find the domain of the function.*

21.  $f(x) = \sqrt{x-2} + \sqrt{4-x}$

23.  $f(x) = \frac{\sqrt{x+2} + \sqrt{2-x}}{x^3 - x}$

28. Refer to the graph of the function  $f$  in the following figure,



- Find  $f(7)$ .
- Find the values of  $x$  corresponding to the point(s) on the graph of  $f$  located at a height of 5 units above the  $x$ -axis.
- Find the point on the  $x$ -axis at which the graph of  $f$  crosses it. What is  $f(x)$  at this point?
- Find the domain and range of  $f$ .

*In Exercise 31-38, find the domain and sketch the graph of the function. What is its range ?*

$$37. \quad f(x) = \begin{cases} -x+1 & \text{if } x \leq 1 \\ x^2-1 & \text{if } x > 1 \end{cases}$$

## Exercise 0.4

*In Exercise 5-8, find  $f \circ g$  and  $g \circ f$ , and give their domains.*

$$5. \quad f(x) = x^2, \quad g(x) = 2x + 3$$

$$7. \quad f(x) = \frac{1}{x}, \quad g(x) = \frac{x+1}{x-1}$$

$$11. \quad \text{Let } f(x) = \begin{cases} x+1 & \text{if } x < 0 \\ x-1 & \text{if } x \geq 0 \end{cases}$$

and let  $g(x) = x^2$ . Find

a.  $g \circ f$ , and sketch its graph

b.  $f \circ g$ , and sketch its graph

*In Exercise 17-22, find function  $f$  and  $g$  such that  $h = g \circ f$ .  
(Note : The answer is not unique.)*

$$17. \quad h(x) = (3x^2 + 4)^{3/2}$$

$$19. \quad h(x) = \frac{1}{\sqrt{x^2 - 4}}$$

25. Use the following table to evaluate each composite function.

$$a. \quad (f \circ g)(1) \quad b. \quad (g \circ f)(2)$$

$$c. \quad f(g(2)) \quad d. \quad g(f(0))$$

$$e. \quad f(f(2)) \quad f. \quad g(g(1))$$

$x$	0	1	2	3	4	5
$f(x)$	1	$\sqrt{2}$	2	4	3	1
$g(x)$	2	3	5	6	7	9