

DIAGNOSTIC TEST: FUNCTIONS

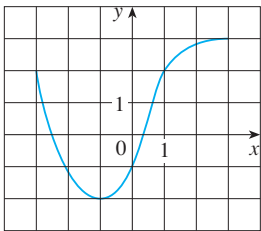


FIGURE FOR PROBLEM 1

- The graph of a function f is given at the left.
 - State the value of $f(-1)$.
 - Estimate the value of $f(2)$.
 - For what values of x is $f(x) = 2$?
 - Estimate the values of x such that $f(x) = 0$.
 - State the domain and range of f .

2. If $f(x) = x^3$, evaluate the difference quotient $\frac{f(2+h) - f(2)}{h}$ and simplify your answer.

3. Find the domain of the function.

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

4. How are graphs of the functions obtained from the graph of f ?

$$y = 2f(x) - 1$$

5. Without using a calculator, make a rough sketch of the graph.

(a) $y = x^3$

(b) $y = (x + 1)^3$

(c) $y = (x - 2)^3 + 3$

6. Let $f(x) = \begin{cases} 1 - x^2 & \text{if } x \leq 0 \\ 2x + 1 & \text{if } x > 0 \end{cases}$

- (a) Evaluate $f(-2)$ and $f(1)$. (b) Sketch the graph of f .

7. If $f(x) = x^2 + 2x - 1$ and $g(x) = 2x - 3$, find each of the following functions.

(a) $f \circ g$

(b) $g \circ f$

(c) $g \circ g \circ g$

8. (a) If $f(x) = \sqrt{3 - x}$, find the inverse function f^{-1} .

- (b) Sketch the graphs of f and f^{-1} on the same coordinate axes.

9. Which of the following are graphs of functions? If the graph is that of a function, is it one-to-one?

