

FIGURE 16

6 PROBLEMS

3.2 EXERCISES

1. (a) What is a one-to-one function?
 (b) How can you tell from the graph of a function whether it is one-to-one?
2. (a) Suppose f is a one-to-one function with domain A and range B . How is the inverse function f^{-1} defined? What is the domain of f^{-1} ? What is the range of f^{-1} ?
 (b) If you are given a formula for f , how do you find a formula for f^{-1} ?
 (c) If you are given the graph of f , how do you find the graph of f^{-1} ?

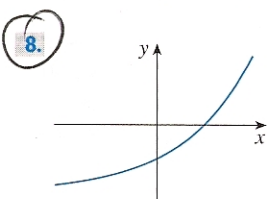
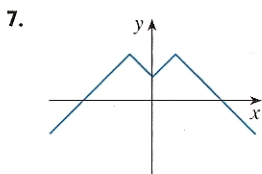
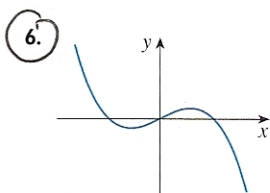
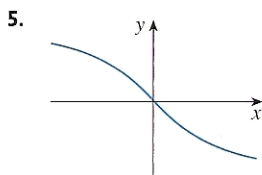
3–14 ■ A function is given by a table of values, a graph, a formula, or a verbal description. Determine whether it is one-to-one.

3.

x	1	2	3	4	5	6
$f(x)$	1.5	2.0	3.6	5.3	2.8	2.0

4.

x	1	2	3	4	5	6
$f(x)$	1	2	4	8	16	32



9. $f(x) = x^2 - 2x$

10. $f(x) = 10 - 3x$

11. $g(x) = 1/x$ 12. $g(x) = \cos x$

13. $f(t)$ is the height of a football t seconds after kickoff.

14. $f(t)$ is your height at age t .

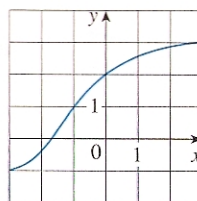
15. If f is a one-to-one function such that $f(2) = 9$, what is $f^{-1}(9)$?

16. If $f(x) = x + \cos x$, find $f^{-1}(1)$.

17. If $g(x) = 3 + x + e^x$, find $g^{-1}(4)$.

18. The graph of f is given.

- (a) Why is f one-to-one?
- (b) What are the domain and range of f^{-1} ?
- (c) What is the value of $f^{-1}(2)$?
- (d) Estimate the value of $f^{-1}(0)$.



19. The formula $C = \frac{5}{9}(F - 32)$, where $F \geq -459.67$, expresses the Celsius temperature C as a function of the Fahrenheit temperature F . Find a formula for the inverse function and interpret it. What is the domain of the inverse function?

20. In the theory of relativity, the mass of a particle with speed v is

$$m = f(v) = \frac{m_0}{\sqrt{1 - v^2/c^2}}$$

where m_0 is the rest mass of the particle and c is the speed of light in a vacuum. Find the inverse function of f and explain its meaning.