8-3B Lesson Master

**SKILLS** Objective B

In 1–10, write an equation for $f^{-1}$.

1. $f(x) = 8x$

2. $f(x) = x + 9$

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

4. $f(x) = -4x + 3$

5. $f(x) = \frac{7}{x}$

6. $f(x) = \frac{x - 5}{2}$

7. $f(x) = -5(x + 10)$

8. $f(x) = \frac{1}{2}x^2$, when $x \geq 0$

9. $f(x) = x^7$, when $x \geq 0$

10. $f(x) = x^8$, when $x \geq 0$

**PROPERTIES** Objective F

11. Consider the function $f$ defined by $f(x) = -5x + 12$.
   a. Write a rule for $f^{-1}(x)$.
   b. Find $f \circ f^{-1}(x)$.
   c. Find $f^{-1} \circ f(x)$.

12. Fill in the Blank If $f(6) = 78$, then $f^{-1}(78) =$

13. Fill in the Blank If $t^{-1}(0) = 8$, then $t(8) =$

In 14–17, two functions $f$ and $g$ are defined over the domain $x \geq 0$. a. Find $f(g(x))$. b. Find $g(f(x))$. c. Tell if $f$ and $g$ are inverses and explain why or why not.

14. $f(x) = x + 4$ and $g(x) = \frac{1}{4}x$
   a. 
   b. 
   c. 

15. $f(x) = x^\frac{4}{7}$ and $g(x) = x^\frac{7}{4}$
   a. 
   b. 
   c. 

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16. \( f(x) = -x \) and \( g(x) = -x \)
   a. 
   b. 
   c. 

17. \( f(x) = x^1 \) and \( g(x) = x^{-1} \)
   a. 
   b. 
   c. 

**REPRESENTATIONS** Objective J

18. Consider the function \( g: x \to x^2 - 1 \), when \( x \geq 0 \).
   a. Graph \( g \) at the right.
   b. Write an equation for \( g^{-1} \).
   c. Graph \( g^{-1} \) on the same axes as \( g \) at the right.
   d. Describe how the graphs of \( g \) and \( g^{-1} \) are related.
   e. Explain why the inverse of \( g \) is not a function if the domain of \( g \) is taken as the set of real numbers.

19. **Multiple Choice** A function \( h \) is graphed below. Which of the following domains for \( h \) gives a function whose inverse is also a function?
   
   A \{ \( x: 1 \leq x \leq 6 \) \}
   B \{ \( x: x \leq 7 \) \}
   C \{ \( x: -5 \leq x \leq 5 \) \}