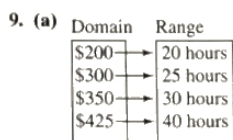


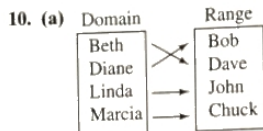
5.2 Concepts and Vocabulary (page 409)

4. One-to-one 5. $y = x$ 6. $[4, \infty)$ 7. False 8. True

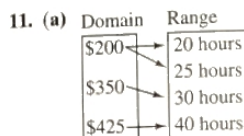
5.2 Exercises (page 409)



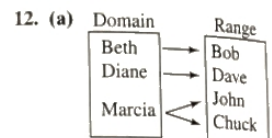
(b) Inverse is a function.



(b) Inverse is a function.

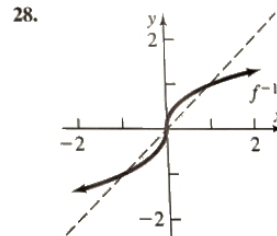
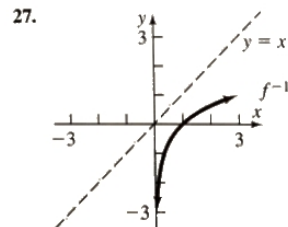
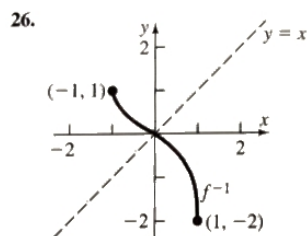
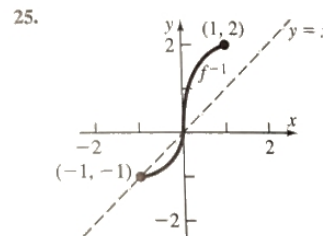
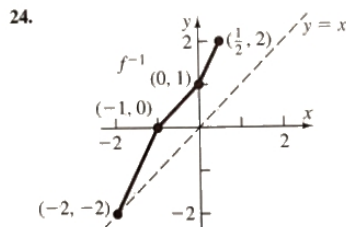
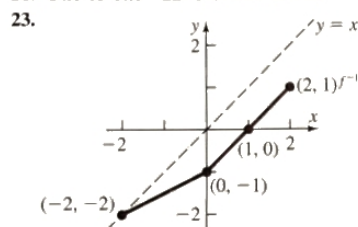


(b) Inverse is not a function.



(b) Inverse is not a function.

13. (a) $\{(6, 2), (6, -3), (9, 4), (10, 1)\}$ (b) Inverse is not a function. 14. (a) $\{(5, -2), (3, -1), (7, 3), (12, 4)\}$
 (b) Inverse is a function. 15. (a) $\{(0, 0), (1, 1), (16, 2), (81, 3)\}$ (b) Inverse is a function. 16. (a) $\{(2, 1), (8, 2), (18, 3), (32, 4)\}$
 (b) Inverse is a function. 17. One-to-one 18. One-to-one 19. Not one-to-one 20. Not one-to-one
 21. One-to-one 22. Not one-to-one



29. $f(g(x)) = f\left(\frac{1}{3}(x-4)\right) = 3\left[\frac{1}{3}(x-4)\right] + 4$
 $= (x-4) + 4 = x;$
 $g(f(x)) = g(3x+4) = \frac{1}{3}[(3x+4)-4] = \frac{1}{3}3x = x$

31. $f(g(x)) = 4\left[\frac{x}{4} + 2\right] - 8 = (x+8) - 8 = x;$
 $g(f(x)) = \frac{4x-8}{4} + 2 = (x-2) + 2 = x$

33. $f(g(x)) = (\sqrt[3]{x+8})^3 - 8 = (x+8) - 8 = x;$
 $g(f(x)) = \sqrt[3]{(x^3-8)+8} = \sqrt[3]{x^3} = x$

30. $f(g(x)) = f\left(-\frac{1}{2}(x-3)\right) = 3 - 2\left(-\frac{1}{2}(x-3)\right)$
 $= 3 + (x-3) = x$
 $g(f(x)) = g(3-2x) = -\frac{1}{2}[(3-2x)-3]$
 $= -\frac{1}{2}(-2x) = x$

32. $f(g(x)) = f\left(\frac{1}{2}x - 3\right) = 2\left(\frac{1}{2}x - 3\right) + 6$
 $= (x-6) + 6 = x$
 $g(f(x)) = g(2x+6) = \frac{1}{2}(2x+6) - 3$
 $= (x+3) - 3 = x$

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

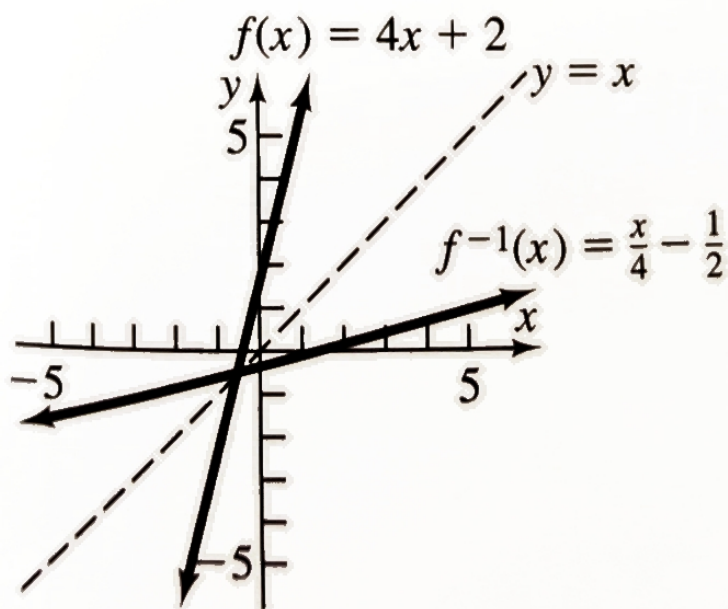
$$41. f^{-1}(x) = \frac{x}{4} - \frac{1}{2}$$

$$f(f^{-1}(x)) = 4\left(\frac{x}{4} - \frac{1}{2}\right) + 2 = (x - 2) + 2 = x$$

$$f^{-1}(f(x)) = \frac{4x + 2}{4} - \frac{1}{2} = \left(x + \frac{1}{2}\right) - \frac{1}{2} = x$$

Domain f = Range f^{-1} = All real numbers

Range f = Domain f^{-1} = All real numbers



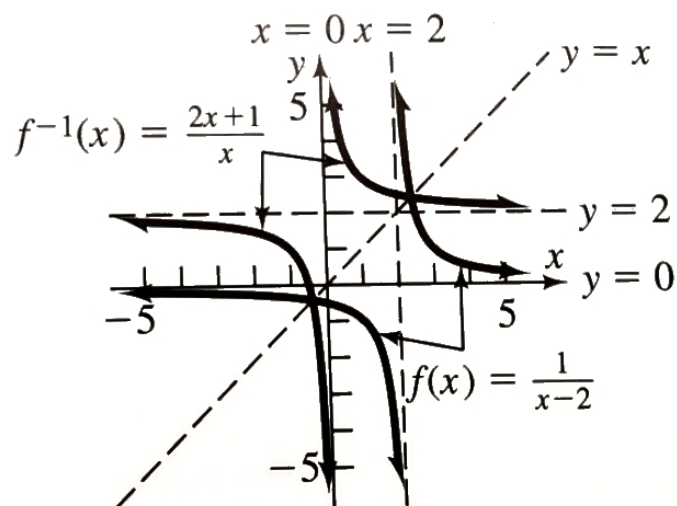
$$49. f^{-1}(x) = \frac{2x + 1}{x}$$

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

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

Domain f = Range f^{-1} = All real numbers except 2

Range f = Domain f^{-1} = All real numbers except 0



$$58. f^{-1}(x) = \frac{3 + 4x}{2 - x}$$

$$\begin{aligned} = x \quad f(f^{-1}(x)) &= f\left(\frac{3 + 4x}{2 - x}\right) = \frac{2\left(\frac{3 + 4x}{2 - x}\right) - 3}{\left(\frac{3 + 4x}{2 - x}\right) + 4} \\ &= \frac{2(3 + 4x) - 3(2 - x)}{(3 + 4x) + 4(2 - x)} = \frac{11x}{11} = x \end{aligned}$$

$$\begin{aligned} = x \quad f^{-1}(f(x)) &= f^{-1}\left(\frac{2x - 3}{x + 4}\right) = \frac{3 + 4\left(\frac{2x - 3}{x + 4}\right)}{2 - \left(\frac{2x - 3}{x + 4}\right)} \\ &= \frac{3(x + 4) + 4(2x - 3)}{2(x + 4) - (2x - 3)} = \frac{11x}{11} = x \end{aligned}$$

Domain f = All real numbers except -4

Range f = Domain f^{-1} = All real numbers except 2