Odd-Numbered Answers to Exercise Set 1.5: Inverse Functions

1. No, it is not a one-to-one function.

Explanation: The graph passes the vertical line test, so it represents a function; but it does not pass the horizontal line test, so it is does not represent a one-to-one function.

3. No, it is not a one-to-one function.

Explanation: The graph does not pass the vertical line test, so it does not represent a function; therefore, it cannot be a one-to-one function.

5. Yes, it is a one-to-one function.

Explanation: The graph passes the vertical line test, so it represents a function; it also passes the horizontal line test, so it represents a one-to-one function.

7. Yes, the function is one-to-one.

9. Yes, the function is one-to-one.

11. No, the function is not one-to-one.

13. No, the function is not one-to-one.

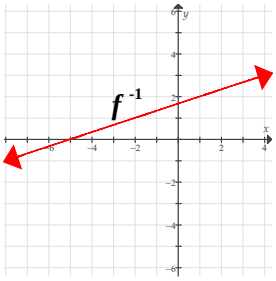
15. **(a)** Interchange the ***x*** and ***y*** values.
(b) Reflect the graph of f over the line $y = x$.

17.

x	$f^{-1}(x)$
–4	**3**
7	2
5	**–4**
0	**5**
3	**0**

19. **(a)** Domain of f: $(-\infty, \infty)$
Range of f: $(-\infty, \infty)$

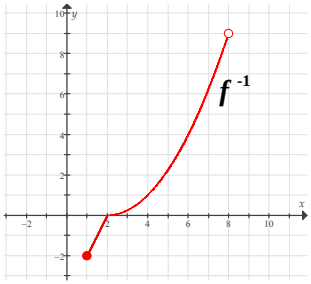
(b)



19. **(c)** Domain of f^{-1}: $(-\infty, \infty)$
Range of f^{-1}: $(-\infty, \infty)$

21. **(a)** Domain of f: $[-2, 9)$
Range of f: $[1, 8)$

(b)



(c) Domain of f^{-1}: $[1, 8)$
Range of f^{-1}: $[-2, 9)$

23. 4

25. –3

27. 3

29. 2

31. 4

33. 3 (Extraneous information is given in this problem. Note that for any inverse functions *f* and *g*, $f[g(x)] = x$ and $g[f(x)] = x$.)

35. $f^{-1}(x) = \dfrac{x+3}{5}$

37. $f^{-1}(x) = \dfrac{8x-3}{-2} = \dfrac{3-8x}{2}$

39. $f^{-1}(x) = \sqrt{x-1}$, where $x \geq 1$

41. $f^{-1}(x) = \sqrt[3]{\dfrac{x+7}{4}}$

43. $f^{-1}(x) = \dfrac{3-2x}{x}$

Odd-Numbered Answers to Exercise Set 1.5: Inverse Functions

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

47. $f^{-1}(x) = \dfrac{x^2-7}{-2} = \dfrac{7-x^2}{2}$

49. No, f and g are not inverses of each other, since $f\left[g(x)\right] \neq x$ and $g\left[f(x)\right] \neq x$.

51. Yes, f and g are inverses of each other, since $f\left[g(x)\right] = x$ and $g\left[f(x)\right] = x$.

53. Yes, f and g are inverses of each other, since $f\left[g(x)\right] = x$ and $g\left[f(x)\right] = x$.

55. Yes, f and g are inverses of each other, since $f\left[g(x)\right] = x$ and $g\left[f(x)\right] = x$.

57. $f^{-1}(500)$ represents the number of tickets sold when the revenue is \$500.

59. Yes, f is one-to-one.

61. Yes, f is one-to-one.

63. No, f is not one-to-one.
Using $x_1 = 3$ and $x_2 = -3$, for example, it can be shown that $f(x_1) = f(x_2)$. However, $x_1 \neq x_2$, and therefore f is not one-to-one. (Answers vary for this counterexample.)

65. No, f is not one-to-one.
Using $x_1 = 2$ and $x_2 = -2$ for example, it can be shown that $f(x_1) = f(x_2)$. However, $x_1 \neq x_2$, and therefore f is not one-to-one. (Answers vary for this counterexample.)