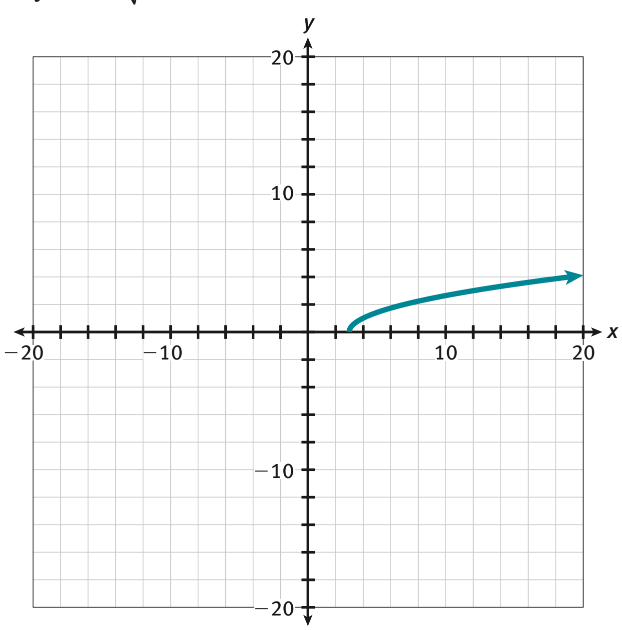
Answers to Algebra 2 Unit 5 Practice

LESSON 25-1

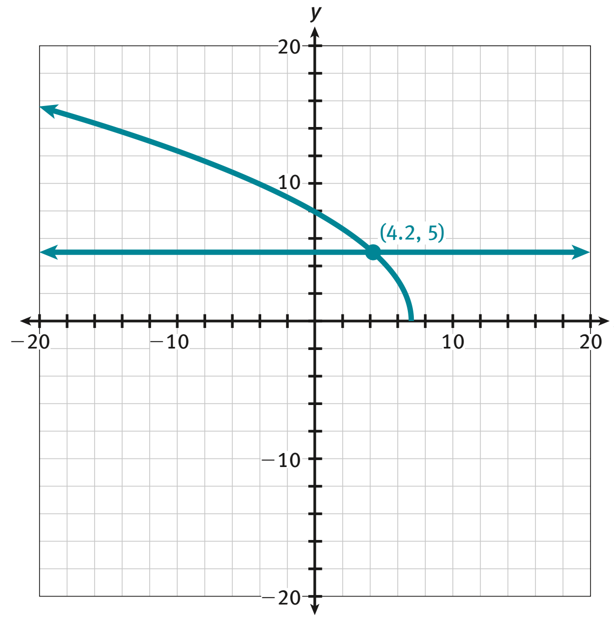
1. D
2. C
3. a. domain: $[6, \infty)$, range: $[0, \infty)$
   b. domain: $[0.5, \infty)$, range: $(-\infty, 2]$
   c. domain: $[0, \infty)$, range : $[-2, \infty)$
4. If the variable under the radical is x, adding to or subtracting from x shifts the position of the graph left or right along the x-axis. Because the domain of the function under the square root radical must always be equal to or greater than zero, the domain shifts along the x-axis as well.
5. a. $f(x) = \sqrt{x-3}$



   b. At least 3 units of fuel are needed to get the ship to start moving. The graph indicates that the speed does not rise above 0 until $x > 3$.

LESSON 25-2

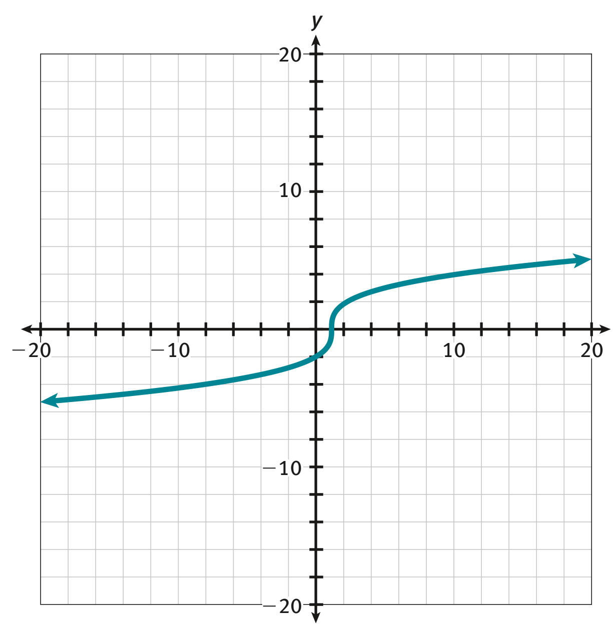
6. B
7. B
8. 86 units
9. $x = 4.2$



10. a. $x = 9.6$
    b. no real roots
    c. $x = 3.5$

LESSON 25-3

11. A
12. $g(x)$ is a compression of $f(x)$ by a factor of $\frac{1}{3}$.
13. $f(x) = 2\sqrt[3]{x-2}$
14. The domain and range for this function are all real numbers.



15. The product of a real number multiplied by itself can never be less than zero. The product of a real number multiplied by itself twice will be a negative number if the original real number is negative.

LESSON 25-4

16. B

17. $x = 2$

18. 29 units

19. $(-0.75, 1.81)$

20. **a.** $x = 30$

b. $x = 2$

c. $x = 6$

LESSON 26-1

21. D

22. C

23. Answers will vary, but should include either an algebraic solution such as $f^{-1}(x) = \frac{x^2}{3}, f^{-1}(3) = 3$, and $f(3) = 3$, or a graph of the function and its inverse showing the point of intersection.

24. The domain of f is the same as the range of f^{-1}, and the range of f is the same as the domain of f^{-1}.

25. **a.** yes

b Substitute the given input values for x into the given function and compare them to the given output values. As the values are similar, the model appears to be appropriate.

LESSON 26-2

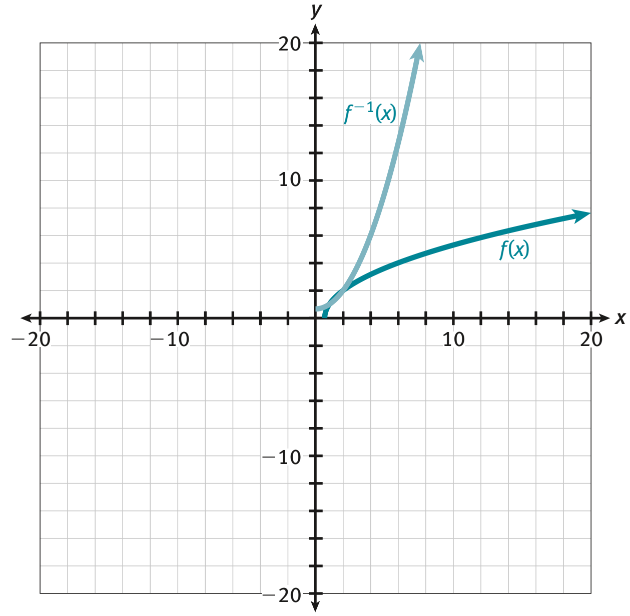
26. C

27. domain: $x \geq 4$, range: $y \geq 0$

28. yes, $x \geq -2$ or $x \leq -2$

29. No, there is no effect, as the constants only translate the original function vertically and/or horizontally.

30. domain: $x > 0$, range: $y \geq \frac{2}{3}$



LESSON 26-3

31. Stacey is incorrect. A one-to-one function must also pass the horizontal line test. This function does not pass it, so it is not one-to-one.

32. The function is one-to-one. The graph passes the horizontal line test.

33. D

34. A

35. Yes; since the function is simply a translation of the parent function, it is also one-to-one.

LESSON 27-1

36. $p(x) = \frac{290}{x}, 1 \leq x \leq 10$

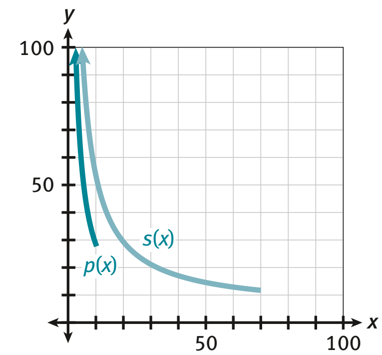
37. 6 students minimum

38. $s(x) = \frac{500 + 4.5x}{x}, 1 \leq x \leq 70$

39. $\frac{500 + 4.5x}{x} = 50, x = 10.99$

There need to be at least 11 students.

40.

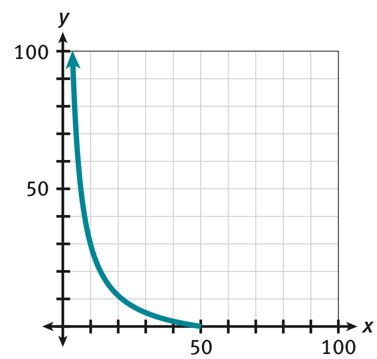


The second function exhibits a greater reduction in per-student pricing because the domain is much less restricted.

LESSON 27-2

41. $\{b: 0 < b \leq 50\}$; at bear populations of less than 1, the calculated deer population approaches infinity. At bear populations of greater than 50, there is a negative number of deer.

42.



43. 30 deer

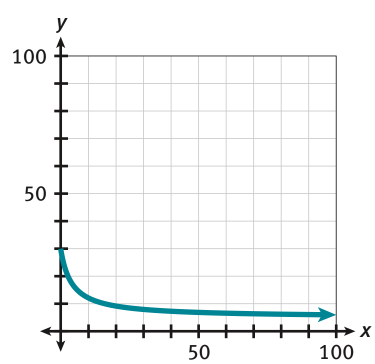
44. The function would be increased by 10*s*:

$$P(b) = \frac{750 - 15b}{2b} + 10s.$$

45. The reasonable domain would extend indefinitely past 50.

LESSON 27-3

46.



47. There are 30 undamaged apples. Using the function $N(b)$, $N(0) = 30$; using the graph, the y-intercept is about 30.

48. $\{y: 5 < y \leq 30\}$

49. $\{x: 0 \leq x\}$; $(0, \infty)$

50. Answers will vary. One possibility is that there are 5 apples located in places inaccessible to the birds, regardless of the number of birds in the area.

LESSON 28-1

51. $y = \frac{8}{x}$

52. $y = \frac{k\sqrt[3]{z}}{\sqrt{x}}$

53. **a.** $F_g = \frac{g m_1 m_2}{r^2}$

b. 1 N

54. D

55. It is false because the *inverse variation* indicates that y changes by a factor of $\frac{1}{3}$.

LESSON 28-2

56. D

57. $f(x) = \frac{1}{x - 3} - 4$

58. x-intercept: -2.25, y-intercept: 4.5, vertical asymptote: $x = -2$, horizontal asymptote: $y = 4$

59. Sadra is incorrect. Explanations may vary but should include a counterexample such as $\frac{1}{x - 2}$ or other solid reasoning.

60. 3.2 units of pressure

LESSON 29-1

61. B

62. D

63. $\frac{4x}{x - 2}$, $x \neq \frac{1}{2}, 2, 3, -7$

64. No; Claire did not correctly cancel $(x + 4)$ in the numerator and denominator. The correctly simplified function is $\frac{3x - 5}{2x + 3}$ and the domain restriction is $x \neq -4, -\frac{3}{2}$.

65. $\frac{3x - 1}{5x + 3}$, $x \neq -\frac{3}{5}, -\frac{1}{3}$

LESSON 29-2

66. $-\frac{3x}{x-1}, x \neq 1, \frac{5}{4}$

67. $\frac{2x+3}{x+1}, x \neq -1, \frac{1}{3}$

68. A and C

69. LCD: $-2x(5x+2)$; $\frac{(x-9)}{(5x+2)}, x \neq 0, -\frac{2}{5}$

70. a. Yes, $\frac{2x-5}{-(x+2)} = \frac{-(2x-5)}{x+2}$ and

$$\frac{-(2x-5)}{x+2} + \frac{2x+5}{x+2} = \frac{10}{x+2}.$$

b. $x \neq -2$

LESSON 29-3

71. B

72. D

73. horizontal asymptote at $y = 0$, vertical asymptote at $x = \frac{5}{3}$, hole at $x = -2$

74. vertical asymptote at $x = -4$, holes at $x = 0$ and $x = 3$

75. a. $y = \frac{1}{2}$

b. $y = 0$

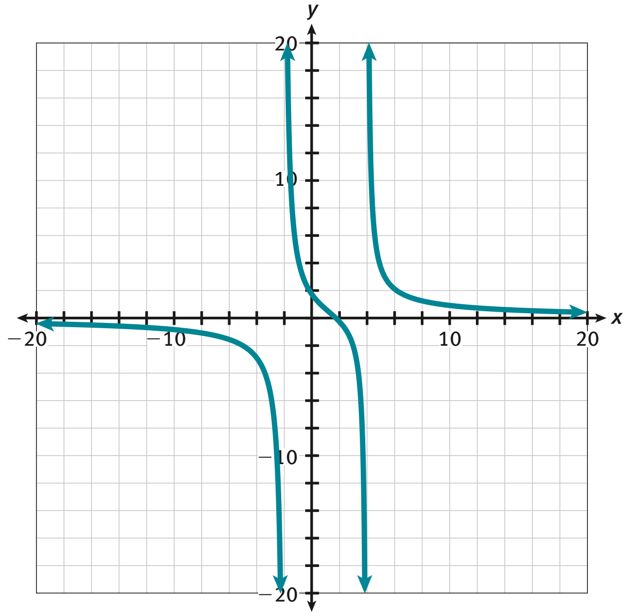
c. no horizontal asymptote

d. $y = \frac{2}{3}$

LESSON 29-4

76. A

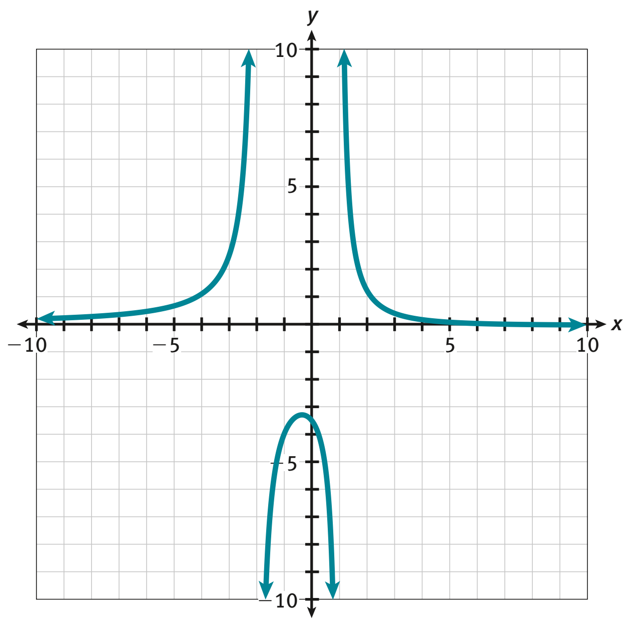
77. a.



b. vertical asymptotes at $x = 4$ and $x = -2$, horizontal asymptote at $y = 0$, no holes

78. domain: $\{x \in \mathbb{R} : x \neq -2 \text{ and } x \neq 4\}$

79.



vertical asymptotes at $x = -2$ and $x = 1$, horizontal asymptote at $y = 0$

80. He was incorrect, as there is a hole at $x = -3$ but no asymptote at $y = -3$. His error was likely the result of incorrectly interpreting the cancellation of $(x + 3)$ in the numerator and denominator after factoring.

LESSON 30-1

81. $x = \pm\frac{2\sqrt{3}}{3}$

82. C

83. $x = \pm\frac{\sqrt{10}}{2}$

84. It is reasonable. Explanations will vary but might include: 50 tons of cargo every 15 minutes equals 200 tons of cargo every hour. So if both cranes together can unload 200 tons of cargo in an hour, it is reasonable to assume that each crane could unload 100 tons of cargo during that hour.

85. B: 4 milliseconds, A: 12 milliseconds

LESSON 30-2

86. B

87. $-2 < x < -1.5$ or $x > 0$

88. $C(x) = \frac{100{,}000{,}000 + 0.5x}{x}$

89. 40,000,000 or more

90. $-\frac{1}{3} < x < 0$ or $x > \frac{1}{3}$