Answer Key

Mid-Year Test

Multiple Choice

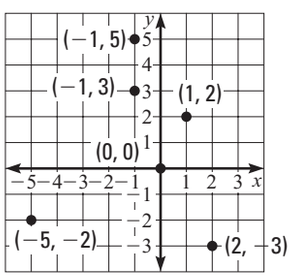
1. D **2.** G **3.** A **4.** H **5.** B **6.** G **7.** D
8. F **9.** B **10.** G **11.** C **12.** F **13.** D
14. H **15.** A **16.** G **17.** B **18.** H **19.** C
20. J **21.** D **22.** F **23.** B **24.** F **25.** B
26. H **27.** D **28.** F **29.** D **30.** G **31.** D
32. F **33.** D **34.** H **35.** C **36.** G **37.** A
38. J **39.** C

Short Response

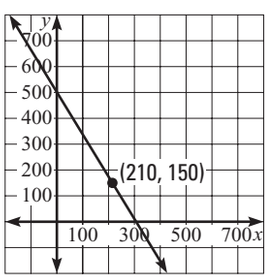
40. 16 **41.** $y = 37 - 1.85x$, where x is a positive integer less than or equal to 20
42a. $4s + 6(8 - s) = 42$ **42b.** 3 pounds **42c.** 5 pounds
43. $x < 1$

44a. Domain $= \{-5, -1, 0, 1, 2\}$ Range $= \{-3, -2, 0, 2, 3, 5\}$

44b.

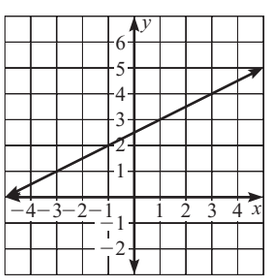


44c. No, it is not a function. The graph fails the vertical-line test.
45. Let x and y be the number of adult and children tickets respectively, the equation is $5x + 3y = 1500$.



If $x = 210$ adult tickets were sold; then $y = 150$ children's tickets were sold.

46. $y = \frac{1}{2}x + \frac{5}{2}$



Answer Key

47a. A: $600 + 50x$, B: $700 + 30x$ **47b.** 5 years

48. $x = 4, y = -3$ **49.** $x = 3, y = 1$

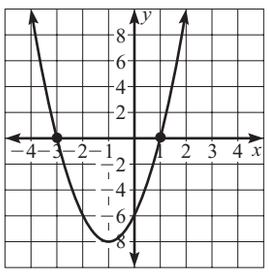
50. The determinant of the coefficient matrix is $2a - 1$. By Cramer's rule, the system is consistent and dependent when $2a - 1 = 0$, or $a = \frac{1}{2}$.

51a. The dimensions of S and T are 3×2, and 2×2, respectively.

51b. $ST = \begin{bmatrix} -51 & 28 \\ 6 & -4 \\ -3 & -8 \end{bmatrix}$, ST is a 3×2 matrix.

52. a is negative. The value of a is -1.

53a.



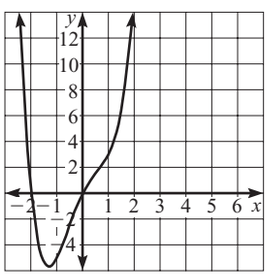
53b. Vertex at $(-1, -8)$. Axis of symmetry $x = -1$

53c. The minimum is -8. **53d.** -3 and 1

54. $(7x + 2)(5x - 3)$

55. $f(x) = 2x^3 + ax^2 + bx^2 - 3 = 0$. Let $x = 1, 2$ and solve: $a = 3$, $b = -2$, so $f(-1) = 0$.

56.



$f(x) \to +\infty$ as $x \to +\infty$

$f(x) \to +\infty$ as $x \to -\infty$

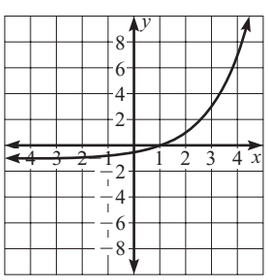
57. Yes. $f(x)$ has the same limit as $x \to +\infty$ and $x \to -\infty$. The degree must be even.

58a. $f(g(x)) = (x^3 - 8)^{-1}$, $g(f(x)) = x^{-3} - 8$

58b. Domain of $f(g(x))$: All real numbers except 2; Domain of $g(f(x))$: All real numbers except 0

58c. $g^{-1}(x) = (x + 8)^{1/3}$ **59.** $x = 21, x = 14$

60a.

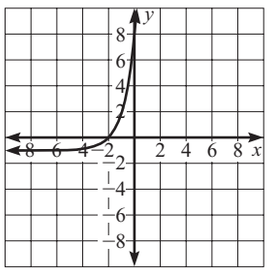


60b. Domain: All real numbers, Range: $y > -1$ **60c.** $y = -1$ **60d.** $x = 4$

Answer Key

61a. $y = \log_3 (x + 1) - 2$ **61b.** Domain: $x > -1$, Range: All real numbers.

61c.



62. $x = 243$