

M I D T E X T D I A G N O S T I C R E V I E W

Use this review to check your understanding of Chapters 1–7. Immediately following this review you will find all answers along with references to examples from this text. If you answer a problem incorrectly, then you can refer to the cited example for a similar problem and solution.

Chapter 1

Evaluate each expression.

- | | |
|---------------------------------|---------------------------------------|
| 1. $-3^2 + 4 \cdot 2$ | 2. $-3 - 2 3 - 5 $ |
| 3. $-\frac{2}{5} + \frac{3}{4}$ | 4. $-\frac{3}{5} \cdot \frac{20}{21}$ |

Identify the property that justifies each equation.

- | | |
|--------------------------------|---------------------|
| 5. $3(x + 4) = 3x + 12$ | 6. $x \cdot 7 = 7x$ |
| 7. $4 + (9 + y) = (4 + 9) + y$ | 8. $0 + 3 = 3$ |

Simplify each expression.

- | | |
|--------------------|----------------------------|
| 9. $5x - (3 - 8x)$ | 10. $x + 3 - 0.2(5x - 30)$ |
| 11. $(-3x)(-5x)$ | 12. $\frac{3x + 12}{3}$ |

Chapter 2

Solve each equation.

- | | |
|-------------------------|-------------------------|
| 13. $11x - 2 = 3$ | 14. $4x - 5 = 12x + 11$ |
| 15. $3(x - 6) = 3x - 6$ | 16. $x - 0.1x = 0.9x$ |

Solve each equation for y .

- | | |
|-------------------|------------------------------------------------|
| 17. $5x - 3y = 9$ | 18. $ay + b = 0$ |
| 19. $a = t - by$ | 20. $\frac{a}{2} + \frac{y}{3} = \frac{3a}{4}$ |

Write a complete solution to each problem.

21. The sum of three consecutive integers is 102. What are the integers?
22. The perimeter of a rectangular painting is 100 inches. If the width is 4 inches less than the length, then what is the width?
23. The area of a triangular piece of property is 44,000 square feet. If the base of the triangle is 400 feet, then what is the height?
24. Ivan has 400 pounds of mixed nuts that contain no peanuts. How many pounds of peanuts should he put into the mixed nuts so that 20% of the mixture is peanuts?

Chapter 3

Solve each inequality. State the solution set using interval notation and graph the solution set.

- | | |
|----------------------|-----------------------|
| 25. $3x - 4 \leq 11$ | 26. $5 - 7w > 26$ |
| 27. $ y - 6 > 8$ | 28. $ 5 - 2q \leq 7$ |

Solve each compound inequality. State the solution set using interval notation.

29. $x + 2 > 5$ and $-3x \leq 6$
30. $3x - 1 > 5$ or $5(x + 1) \leq 5$
31. $x - 6 \geq 8$ and $x + 5 < 9$
32. $2x \leq 7$ or $5x - 1 > 9$

Write a complete solution to each problem.

33. Charlie gets a 20% employees discount on clothes at the Toggery Shoppe. If he can afford at most \$300 for a new suit and the store does not sell suits for less than \$200, then what is the price range for the list price of suits that he can afford? Use interval notation to express your answer.
34. Kim's and Kurt's ages differ by 5 years and Kim is 23 years old. Write an absolute value equation that describes this situation. What are the possibilities for Kurt's age?
35. A rectangular flower bed is twice as long as it is wide. If the perimeter of the flower bed is less than 120 feet, then what are the possibilities for the width? Use interval notation to express your answer.
36. Alan's and Linda's grades on a test differed by less than 6 points and Linda's grade was 86. Write an absolute value inequality that describes this situation. What are the possibilities for Alan's grade? Use interval notation to express your answer.

Chapter 4

Find the slope of each line.

37. The line passing through the points (1, 2) and (3, 6)
38. The line whose equation is $y = \frac{1}{2}x - 4$
39. The line parallel to $2x + 3y = 9$
40. The line perpendicular to $y = -3x + 5$

Find the equation of each line.

41. The line passing through the points (0, 3) and (2, 11)
42. The line passing through the points (-2, 4) and (1, -2)
43. The line through (3, 5) that is parallel to $x = 4$
44. The line through (0, 8) that is perpendicular to $y = \frac{1}{2}x$

Sketch each graph.

45. The graph of the equation $y = \frac{2}{3}x - 2$
46. The graph of the equation $3x - 5y = 150$
47. The graph of $y = 2$ in the coordinate plane
48. The graph of $x = 2$ in the coordinate plane

Chapter 5

Perform the indicated operations.

49. $(x^2 - 3x + 2) - (3x^2 + 9x - 4)$

50. $(x + 7)(x - 9)$

51. $(4w^2 - 3)^2$

52. $(x^3 - 2x^2 - x - 6) \div (x - 3)$

Use the rules of exponents to simplify each expression. Write the answers without negative exponents.

53. $-8x^4 \cdot 4x^3$

54. $3x(5x^2)^3$

55. $\frac{-6x^2y^3}{-2x^{-3}y^4}$

56. $\left(\frac{2a^2}{a^{-3}}\right)^3$

Perform each operation without a calculator. Write the answer in scientific notation.

57. $400,000 \cdot 600$

58. $(9 \times 10^3)(2 \times 10^6)$

59. $(2 \times 10^{-3})^4$

60. $\frac{2 \times 10^{-9}}{2000}$

Chapter 6

Factor each polynomial completely.

61. $24x^2y^3 + 18xy^5$

62. $x^2 - 3x - 54$

63. $4w^2 - 36w + 81$

64. $2a^3 - 6a^2 - 108a$

Solve each equation.

65. $x^2 = x$

66. $2x^3 - 8x = 0$

67. $a^2 + a - 6 = 0$

68. $(b - 2)(b + 3) = 24$

Write a complete solution to each problem.

69. The sum of two numbers is 10 and their product is 21. Find the numbers.

70. The length of a new television screen is 14 inches larger than the width and the diagonal is 26 inches. What are the length and width?

Chapter 7

Perform the indicated operation. Write each answer in lowest terms.

71. $\frac{5x}{2} + \frac{3x}{4}$

72. $\frac{5}{x-2} - \frac{3}{2-x}$

73. $\frac{9}{x^2-9} + \frac{2x}{x-3}$

74. $\frac{2}{a-5} + \frac{3}{a+4}$

75. $\frac{w^3}{2w-4} \cdot \frac{w^2-4}{w}$

76. $\frac{5ab^2}{6a^2b^3} \div \frac{10a}{21b^6}$

Solve each equation.

77. $\frac{2}{x} = \frac{3}{4}$

78. $\frac{1}{w-3} = \frac{2}{w+5}$

79. $\frac{1}{x} + \frac{3}{7} = \frac{1}{3x}$

80. $\frac{3}{a-1} + \frac{1}{a+2} = \frac{17}{10}$

Solve each formula for y .

81. $\frac{3}{y} = \frac{5}{x}$

82. $a = \frac{1}{2}y(w - c)$

83. $\frac{y-3}{x+5} = -3$

84. $\frac{3}{y} + \frac{1}{2} = \frac{1}{t}$

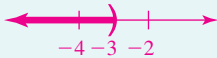
ANSWERS TO MIDTEXT DIAGNOSTIC REVIEW

If your answer is wrong, you can refer to the given example for a similar exercise and explanation.

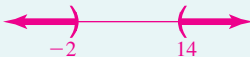
1. -1 ; Section 1.5 Example 6
2. -7 ; Section 1.5 Example 1
3. $\frac{7}{20}$; Section 1.2 Example 7
4. $-\frac{4}{7}$; Section 1.2 Example 4
5. Distributive property; Section 1.7 Examples 5 and 8
6. Commutative property of multiplication; Section 1.7 Examples 2 and 8
7. Associative property of addition; Section 1.7 Example 8
8. Identity property; Section 1.7 Example 8
9. $13x - 3$; Section 1.8 Examples 7 and 8
10. 9; Section 1.8 Examples 7 and 8
11. $15x^2$; Section 1.8 Example 5
12. $x + 4$; Section 1.8 Example 6
13. $\left\{\frac{5}{11}\right\}$; Section 2.2 Examples 1 and 2
14. $\{-2\}$; Section 2.2 Example 5
15. No solution, \emptyset ; Section 2.3 Example 2
16. All real numbers; Section 2.3 Example 1
17. $y = \frac{5}{3}x - 3$; Section 2.4 Examples 1–5
18. $y = -\frac{b}{a}$; Section 2.4 Examples 1–5
19. $y = \frac{t-a}{b}$; Section 2.4 Examples 1–5
20. $y = \frac{3}{4}a$; Section 2.4 Examples 1–5
21. 33, 34, 35; Section 2.6 Example 1
22. 23 in.; Section 2.6 Example 2
23. 220 ft; Section 2.6 Example 2
24. 100 pounds; Section 2.7 Example 5
25. $(-\infty, 5]$; Section 3.1 Examples 3 and 4



26. $(-\infty, -3)$; Section 3.1 Examples 3 and 4



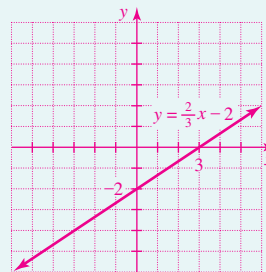
27. $(-\infty, -2) \cup (14, \infty)$; Section 3.3 Examples 5–7



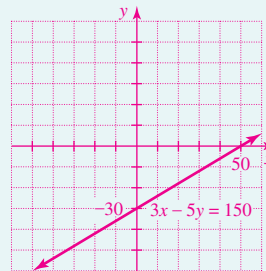
28. $[-1, 6]$; Section 3.3 Examples 5–7



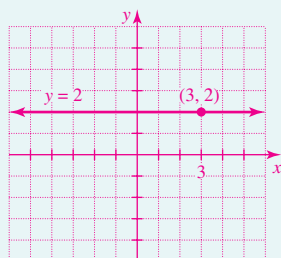
29. $(3, \infty)$; Section 3.2 Example 8
30. $(-\infty, 0] \cup (2, \infty)$; Section 3.2 Example 9
31. No solution; Section 3.2 Example 7
32. $(-\infty, \infty)$; Section 3.2 Example 7
33. $[200, 375]$; Section 3.1 Examples 7 and 8
34. $|x - 23| = 5$, 18 or 28; Section 3.3 Example 10
35. $(0, 20)$; Section 3.1 Examples 7 and 8
36. $|x - 86| < 6$, $(80, 92)$; Section 3.3 Example 10
37. 2; Section 4.2 Examples 2 and 3
38. $\frac{1}{2}$; Section 4.3 Examples 1 and 2
39. $-\frac{2}{3}$; Section 4.4 Example 3
40. $\frac{1}{3}$; Section 4.3 Example 6
41. $y = 4x + 3$; Section 4.4 Example 2
42. $y = -2x$; Section 4.4 Example 2
43. $x = 3$; Section 4.4 Example 3
44. $y = -2x + 8$; Section 4.4 Example 4
45. Section 4.3 Example 4



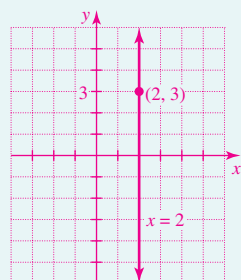
46. Section 4.1 Example 6



47. Section 4.1 Example 4



48. Section 4.1 Example 5



49. $-2x^2 - 12x + 6$; Section 5.1 Example 5
 50. $x^2 - 2x - 63$; Section 5.2 Example 3
 51. $16w^4 - 24w^2 + 9$; Section 5.4 Example 1
 52. $x^2 + x + 2$; Section 5.5 Example 4
 53. $-32x^7$; Section 5.2 Example 1
 54. $375x^7$; Section 5.6 Example 3
 55. $\frac{3x^5}{y}$; Section 5.6 Example 1
 56. $8a^{15}$; Section 5.6 Example 4
 57. 2.4×10^8 ; Section 5.7 Example 8
 58. 1.8×10^{10} ; Section 5.7 Example 7
 59. 1.6×10^{-11} ; Section 5.7 Example 7
 60. 1×10^{-12} ; Section 5.7 Example 7

61. $6xy^3(4x + 3y^2)$; Section 6.1 Example 5
 62. $(x - 9)(x + 6)$; Section 6.3 Examples 1–3
 63. $(2w - 9)^2$; Section 6.2 Examples 2 and 3
 64. $2a(a - 9)(a + 6)$; Section 6.3 Example 6
 65. 0, 1; Section 6.6 Example 2
 66. $-2, 0, 2$; Section 6.6 Example 5
 67. $-3, 2$; Section 6.6 Example 1
 68. $-6, 5$; Section 6.6 Example 3
 69. 3 and 7; Section 6.6 Example 6
 70. Length 24 in., width 10 in.; Section 6.6 Example 7
 71. $\frac{13x}{4}$; Section 7.4 Example 4
 72. $\frac{8}{x-2}$; Section 7.4 Example 5
 73. $\frac{2x^2 + 6x + 9}{x^2 - 9}$; Section 7.4 Example 5
 74. $\frac{5a - 7}{(a - 5)(a + 4)}$; Section 7.4 Examples 4–6
 75. $\frac{w^3 + 2w^2}{2}$; Section 7.2 Example 3
 76. $\frac{7b^5}{4a^2}$; Section 7.2 Example 5
 77. $\frac{8}{3}$; Section 7.6 Examples 1 and 2
 78. 11; Section 7.7 Example 5
 79. $-\frac{14}{9}$; Section 7.6 Examples 1 and 2
 80. $-\frac{23}{13}, 2$; Section 7.6 Example 3
 81. $y = \frac{3}{5}x$; Section 7.8 Example 2
 82. $y = \frac{2a}{w - c}$; Section 7.8 Examples 1–3
 83. $y = -2x - 12$; Section 7.8 Example 1
 84. $y = \frac{6t}{2 - t}$; Section 7.8 Example 3