

Diagnostic Test

For use before Topic 1

Operations with Integers (Topic 1, Lesson 1, pages 1–7)

Evaluate the expression.

1. $-11 + 6$

2. $-7 - 19$

3. $9(-9)$

4. $42 \div (-6)$

5. $5(9 - 15)$

6. $\frac{30 - 6}{2 \cdot 4^2 - 20}$

Operations with Rational Numbers (Topic 1, Lesson 2, pages 8–13)

Evaluate the expression. Write your answer in simplest form.

7. $\frac{3}{8} + \frac{7}{8}$

8. $\frac{2}{3} - \frac{5}{12}$

9. $12.65 - 9.899$

10. $\frac{6}{9} \times \left(-\frac{12}{14}\right)$

11. $\frac{18}{7} \div \frac{6}{14}$

12. 17.5×3.65

13. $\frac{1}{3} - \left(\frac{2}{9} + \frac{5}{6}\right)$

Square Root Concepts (Topic 1, Lesson 3, pages 14–18)

Evaluate the expression.

14. $\sqrt{36}$

15. $\pm\sqrt{16}$

16. $-2\sqrt{81}$

Approximate the square root.

17. $\sqrt{52}$

18. $-\sqrt{108}$

19. $\sqrt{80}$

Simplifying Square Roots (Topic 1, Lesson 4, pages 19–23)

Simplify the expression. Rationalize the denominator when necessary.

20. $\sqrt{28}$

21. $\sqrt{6} \cdot \sqrt{12}$

22. $3\sqrt{\frac{7}{12}}$

23. $3\sqrt{6} - 8\sqrt{6}$

24. $\sqrt{128} + \sqrt{50}$

25. $\sqrt{3} \cdot \sqrt{6} - \sqrt{18}$

Evaluating Expressions (Topic 2, Lesson 1, pages 25–29)

Write a variable expression for the verbal phrase.

26. 36 divided by x

27. x minus 19

28. 45 plus x

29. -8 times x

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
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27. _____
28. _____
29. _____

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Evaluate the expression for the given value of the variable.

30. $-6x$ when $x = -9$

31. $\frac{y}{7}$ when $y = -49$

Simplifying Expressions (Topic 2, Lesson 2, pages 30–34)**Simplify the expression.**

32. $-28 + 13x + 16$

33. $10x - (-3x + 5)$

34. $(2y^2 - 9y + 16) - (5y^2 + 3y - 3)$

35. $(6x^2 + 7x + 1) + (-2x^2 - 8)$

36. $4y(2 - y) + 3y^2$

37. $-7x + 8(-2x + 5)$

Properties of Powers (Topic 2, Lesson 3, pages 35–39)**Evaluate the exponential expression. Write the answer in simplest form.**

38. $3^3 \cdot 3^2$

39. $\left(\frac{1}{2}\right)^{-1}$

40. $\frac{5^6}{5^4}$

Simplify the expression. The simplest expression should have no negative exponents.

41. $\frac{4x^8}{6x^{-5}}$

42. $(3x \cdot x^3)^{-2}$

43. $(12xy)^0(x^2y^4)^5$

Simplifying Expressions with Powers (Topic 2, Lesson 4, pages 40–44)**Simplify the product.**

44. $(2x)(3x^3 - 5x)$

45. $(6xy^2)(-8x + 9y)$

46. $\frac{x^2y}{3y^3x^3} \cdot \frac{18x^4y^2}{xy^6}$

47. $\frac{2x^{-2}y}{3y^{-3}x^2} \cdot \frac{3x^4}{8y^{-2}}$

Evaluate the expression. Write the result in scientific notation.

48. $(3 \times 10^3) \cdot (9 \times 10^{-2})$

49. $\frac{2.4 \times 10^{-2}}{1.2 \times 10^{-5}}$

Solving Equations (Topic 3, Lesson 1, pages 46–51)**State the inverse.**

50. Subtract 21

51. Divide by -6

52. Multiply by 14

Solve the equation.

53. $x - 18 = -3$

54. $\frac{2}{3}x = 18$

55. $5x - 3 = 12$

30. _____

31. _____

32. _____

33. _____

34. _____

35. _____

36. _____

37. _____

38. _____

39. _____

40. _____

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43. _____

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51. _____

52. _____

53. _____

54. _____

55. _____

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Solving Inequalities (Topic 3, Lesson 2, pages 52–57)

Solve the inequality.

56. $x + 4 < 18$

57. $-9 \geq 5 + x$

58. $-8x \leq 40$

59. $\frac{x}{12} > -\frac{1}{3}$

60. $6 < -5x + 11$

61. $9 \leq \frac{2}{3}x - 3$

Solving Multi-Step Equations and Inequalities

(Topic 3, Lesson 3, pages 58–63)

Solve the equation if possible.

62. $16x + 24 = 7(x + 6)$

63. $-4(2x - 1) = 3 - 8x$

64. $5(2x - 3) = -15 + 10x$

65. $-6x^2 = -216$

Solve the inequality.

66. $3(4x - 5) < -3x$

67. $-6 - x \geq -7x + 12$

68. $8(2 - x) \leq -4(x - 5)$

Writing and Solving Proportions (Topic 3, Lesson 4, pages 64–69)

Solve the proportion.

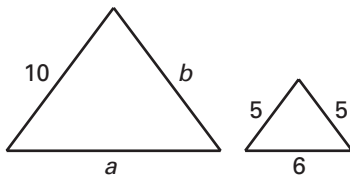
69. $\frac{x}{8} = \frac{3}{12}$

70. $\frac{x + 6}{4} = \frac{-4x}{16}$

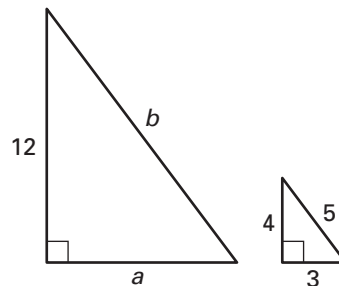
71. $\frac{2}{3} = \frac{x + 7}{3x}$

In Exercises 72 and 73, pairs of similar triangles are shown. Find the missing lengths of sides.

72.



73.



56. _____

57. _____

58. _____

59. _____

60. _____

61. _____

62. _____

63. _____

64. _____

65. _____

66. _____

67. _____

68. _____

69. _____

70. _____

71. _____

72. $a =$ _____

$b =$ _____

73. $a =$ _____

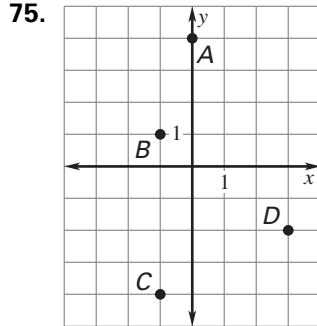
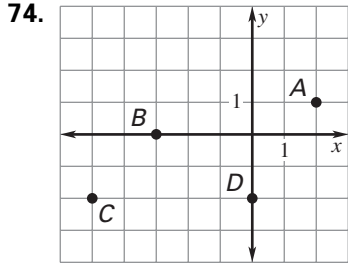
$b =$ _____

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Plotting Points (Topic 4, Lesson 1, pages 71–75)

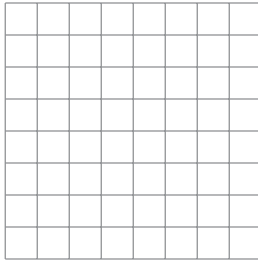
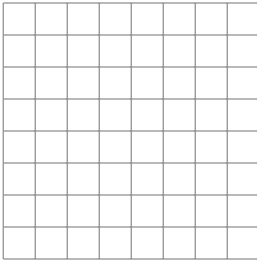
Write the ordered pairs that correspond to *A*, *B*, *C*, and *D*.



Plot the ordered pair in the coordinate plane and tell whether it is in Quadrant 1, Quadrant 2, Quadrant 3, or Quadrant 4.

76. $(-3, 2)$

77. $(5, -1)$



Slope-Intercept Form of a Linear Equation

(Topic 4, Lesson 2, pages 76–80)

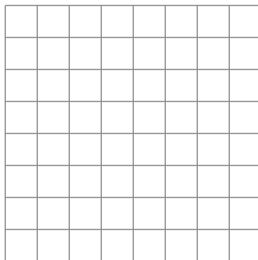
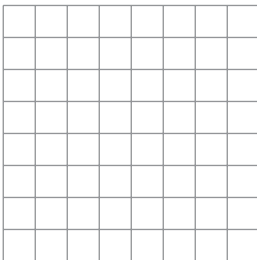
Find the slope and *y*-intercept of the graph of the equation.

78. $y = -2x + 7$ 79. $3x + 6y = 12$ 80. $y = \frac{2x + 7}{14}$

Graph the equation.

81. $y = x + 3$

82. $y = -2x + 1$



74. *A* _____

B _____

C _____

D _____

75. *A* _____

B _____

C _____

D _____

76. Plot at left _____

Quadrant: _____

77. Plot at left _____

Quadrant: _____

78. _____

79. _____

80. _____

81. Use graph at left. _____

82. Use graph at left. _____

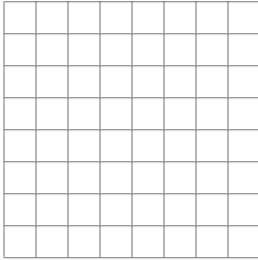
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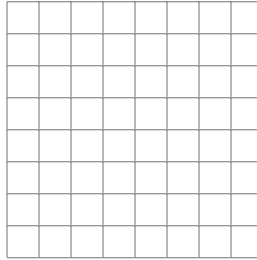
Quick Graphs Using Intercepts (Topic 4, Lesson 3, pages 81–84)

Find the x -intercept and the y -intercept of the graph of the equation. Then graph the equation.

83. $y = x - 5$



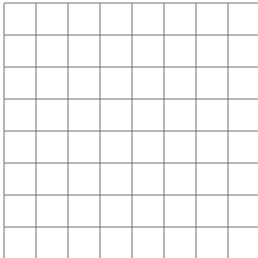
84. $6x + 2y = -12$



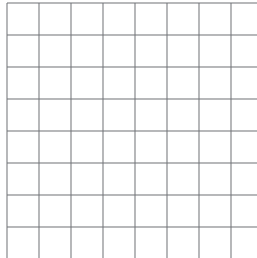
Nonlinear Equations (Topic 4, Lesson 4, pages 85–89)

Sketch the graph of the parabola.

85. $y = 3x^2$

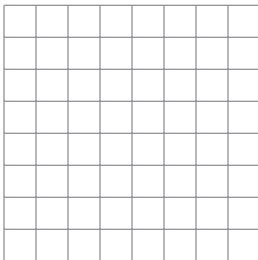


86. $y = x^2 + 4x - 2$

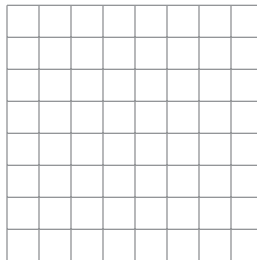


Sketch the graph of the absolute-value equation.

87. $y = |x|$



88. $y = |x - 3|$



Common Monomial Factors (Topic 5, Lesson 1, pages 91–95)

Find the greatest common factor and factor it out of the expression.

89. $-4x^3 - 20x^2 + 16x$

90. $15x^5 - 10x^4 + 5x^2$

91. $3x^5y^2 - 21x^2y^7$

92. $-2x^2y^3 + 7xy^7$

83. _____

Use graph at left.

84. _____

Use graph at left.

85. Use graph at left.

86. Use graph at left.

87. Use graph at left.

88. Use graph at left.

89. _____

90. _____

91. _____

92. _____

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Factoring $x^2 + bx + c$ (Topic 5, Lesson 2, pages 96–100)**Factor the trinomial.**

93. $x^2 + 6x + 9$

94. $x^2 - 12x + 36$

95. $x^2 - 2x - 24$

96. $x^2 + 2x - 35$

Factoring $ax^2 + bx + c$ (Topic 5, Lesson 3, pages 101–105)**Factor the trinomial.**

97. $2x^2 + x - 6$

98. $9x^2 + 24x + 16$

99. $3x^2 - 17x - 56$

100. $12x^2 + 46x - 36$

Factoring Special Cases (Topic 5, Lesson 4, pages 106–110)**Factor the expression.**

101. $9x^2 - 81$

102. $x^2 + 20x + 100$

103. $121 - x^2$

Factor the expression completely.

104. $x^4 - 9x^2$

105. $x^3 + 11x^2 + 28x$

106. $-3x^3 - 15x^2 - 12x$

107. $8x^3 - 3x^2 + 16x - 6$

93. _____

94. _____

95. _____

96. _____

97. _____

98. _____

99. _____

100. _____

101. _____

102. _____

103. _____

104. _____

105. _____

106. _____

107. _____