Preparing for Algebra 2

SUMMER MATH

1) DIRECTIONS: Please complete this packet over the course of the summer. We recommend that you do a little at a time to stay in practice, rather than rushing to complete it on the last day of summer. There will be a quiz on the topics included in this packet within the first 2 weeks of school. Helpful websites if you get stuck: www.khanacademy.org, www.mathsisfun.com, & www.purplemath.com. To keep your computational skills strong, avoid using a calculator!

Evaluate each expression.

2) \((-3) - (2 - 3)(-1)\)

3) \(\frac{(-6) + 4}{8 - 6}\)

Evaluate each using the values given.

4) \(\lvert y \rvert + xy + x; \) use \(x = 4, \) and \(y = -6\)

5) \(ba + a^2 - c; \) use \(a = -3, \) \(b = 5,\) and \(c = 6\)

6) \(y - (z - (-6)^2 + 4); \) use \(y = -2,\) and \(z = 10\)

7) \(x + z - z + x - z; \) use \(x = 8,\) and \(z = -9\)

Simplify each expression.

8) \(3m + 3(1 - 4m)\)

9) \(-3(n + 5) - 1\)

10) \(5r(2 - 7r) + 7(-4 - 4r)\)

11) \(-4(7 - 2x) + 6(3x - 4)\)

Solve each equation.

12) \(-7n + 6 = 3(3 - 2n)\)

13) \(-37 + 5p = -3(2p + 6) + 3\)

14) \(7(n + 4) = 7n + 28\)

15) \(8(n + 3) = -6 + 2n\)

16) \(-27.702 - 7.2p = 1.7(1 - 1.4p)\)

17) \(39.484792 + 5.952m = -7.7(1 - 4.08m)\)

18) \(-3(10 - 5x) = 6(x - 2)\)

19) \(10(9n - 8) = 8(-10 + 8n)\)
20) $3(3x + 1) = 9x + 123$

21) $5(-4m + 2) = 10(-3m + 7)$

22) Kristin made a trip to the ferry office and back. The trip there took 4.5 hours and the trip back took 3.2 hours. She averaged 22.1 mph faster on the return trip than on the outbound trip. Find Kristin's average speed on the outbound trip.

23) A passenger train left the station at the same time as a cattle train. The trains traveled in opposite directions. The cattle train traveled at a speed of 51 km/h. After 13.5 hours they were 990.9 km apart. How fast did the passenger train travel?

24) 1 ml of an acid solution was mixed with 3 ml of a 62% acid solution to make a 47% acid solution. Find the percent concentration of the first solution.

25) How many lb. of a metal containing 40% gold must be combined with 1 lb. of a metal containing 60% gold to form an alloy containing 44% gold?

Solve each equation.

26) $|k + 1| = 4$

27) $|n - 6| = 4$

Solve each inequality and graph its solution.

28) $5 - 6x + 6 < 17$

29) $5 \leq p + 6 + 5$

30) $-33 - 3x < -6(x + 3)$

31) $-v + \frac{29}{21} \geq -\frac{2}{7}\left(\frac{3}{2}v + \frac{1}{6}\right)$
Sketch the graph of the function. Label key features.

32) \( y = \frac{7}{4}x - 4 \)

33) \( y = -\frac{1}{3}x - 2 \)

34) \( x - y = 4 \)

35) \( x + 3y = -6 \)

36) \( 0 = 2y - 4x - 8 \)

37) \( y = x^2 - 6x + 11 \)

Fun in the SUN
Write the slope-intercept form of the equation of each line given the slope and y-intercept.

38) Slope = -1, y-intercept = 2

39) Slope = 0, y-intercept = 4

Write the slope-intercept form of the equation of each line.

40) 3x + 7y = -35

41) 5x + 3y = -6

42) 5x = 4y - 16

43) 4 = y - x

Sketch the graph of each line.

44) x-intercept = -5, y-intercept = 2

45) x-intercept = 3, y-intercept = -2

Write the slope-intercept form of the equation of the line through the given point with the given slope.

46) through: (-3, 1), slope = $\frac{4}{5}$

47) through: (-4, -4), slope = 1

Write the slope-intercept form of the equation of the line through the given points.

48) through: (-2, 3) and (-5, 4)

49) through: (5, -4) and (-4, -5)

Write the slope-intercept form of the equation of the line described.

50) through: (-4, 3), parallel to $y = \frac{6}{5}x + 5$

51) through: (-5, -3), perpendicular to $y = -9x + 4$
Sketch the graph of each linear inequality.

52) \(4x - y \leq -5\)

53) \(x - y < -3\)

Simplify each expression.

54) \((5b^4 + 6b^3 + 5b + 4) + (5b^3 - 6b + 6b^4)\)

55) \((-7v - 5 - 7v^2 - 3v^3) + (-6 + 3v - 6v^3)\)

56) \((-8x^2 - x - 8x^4 - 8) - (-2x^4 + 8x)\)

57) \((1.6r^2 + 6r^3 - 6.4) - (6.469 + 0.5r^2 - 1.4r)\)

Find each product.

58) \((n + 5)(n + 3)\)

59) \((6m - 4)(5m + 8)\)

60) \((8b - 1)(b + 8)\)

61) \((3x - 2)(2x - 3)\)

62) \((8r + 1)(3r + 4)\)

63) \((2n + 3)^2\)

64) \((-4x + 1)(6x + 5)\)

65) \(0.4(6.1x - 3.9)\)

Simplify.

66) \(\sqrt{128}\)

67) \(\sqrt{45}\)

68) \(\sqrt{200x}\)

69) \(\sqrt{24k^3}\)
70) \(-2\sqrt{5} + 2\sqrt{3} - 3\sqrt{3}\) 
71) \(2\sqrt{6} - \sqrt{6} + 3\sqrt{6}\)

72) \(2\sqrt{24} - 2\sqrt{5} - 2\sqrt{20}\) 
73) \(3\sqrt{12} - 3\sqrt{27} + 2\sqrt{27}\)

74) \(\sqrt{2} \cdot \sqrt{6}\) 
75) \(\sqrt{6b^3} \cdot \sqrt{15b}\)

76) \(\frac{\sqrt{35}}{\sqrt{20}}\) 
77) \(\frac{\sqrt{18}}{\sqrt{27}}\)

78) A landscaper has a piece of tubing that is 45 feet long. He cuts it into five pieces. Three of the pieces are the same length. The other two pieces are 3 feet and 5 feet longer than the equal-length pieces.
   a) Draw a diagram of this situation.
   b) Write and solve an equation to find the lengths of the 5 pieces.

79) A right triangle has one leg that is twice as long as the other leg. The hypotenuse is \(2\sqrt{5}\) inches. Find the unknown lengths.

80) A right triangle has a hypotenuse that is 3 feet longer than one leg. The other leg is 4 feet. Find the unknown lengths.

81) A population of 100 Valonia ventricosa increases by 20% every year. After 6 such increases, how many Valonia ventricosa would there be?

82) Another population of 299 Valonia ventricosa is decreasing by 20% every year. After 6 such decreases, what is the population of Valonia ventricosa?

83) Simplify \(a^5 a^3 a^0\)

84) Simplify \(\frac{a^5}{a^3}\)

85) Simplify \((a^5)^2\)

86) Simplify \((3x^3 y^4)^2\)

87) Simplify \(3 \cdot (5x^{-3} \cdot y)^{-2}\)

88) Simplify \(\frac{5x^{-7} y^3}{15x^2 y^{-2}}\)

89) Simplify \(\frac{1}{2} \cdot \frac{2}{3} \cdot \frac{3}{4} \cdot \frac{4}{5} \cdot \frac{5}{6}\)

90) Simplify \(\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \frac{5}{6}\)
Solve each equation by taking square roots. Give exact, simplified answers.

91) \(5n^2 + 8 = 413\) \hspace{5em} 92) \(5b^2 - 9 = 396\)

Solve each equation by taking square roots. Round answers to nearest thousandth.

93) \(8x^2 + 7 = 423\) \hspace{5em} 94) \(2r^2 + 7 = 189\)

Solve each equation by factoring.

95) \(x^2 + 4x = 5\) \hspace{5em} 96) \(a^2 - 7a = -10\)

97) \(3x^2 - 6x = 72\) \hspace{5em} 98) \(n^2 - 25 = 0\)

99) \(5n^2 + 60 = 40n\) \hspace{5em} 100) \(b^2 - 21 = -4b\)

Solve each equation with the quadratic formula.

101) \(6n^2 - 30 = 11n\) \hspace{5em} 102) \(k^2 - 3k = 10\)

103) \(2x^2 + 3x = 90\) \hspace{5em} 104) \(0 = -4p^2 + 11p + 69\)

105) \(-10 - 4m = -5m^2\) \hspace{5em} 106) \(16m^2 - 5m - 12 = 10m^2 + 5m\)

Find all roots.

107) \((x - 5)(x + 1) = 0\) \hspace{5em} 108) \(x(x - 3)(x + 2) = 0\)

Solve each system by substitution.

109) \(\begin{align*} y &= -2x + 6 \\ 6x + 5y &= 14 \end{align*}\) \hspace{5em} 110) \(\begin{align*} x - 5y &= 7 \\ 5x - 7y &= -1 \end{align*}\)
Solve each system by elimination.

111) \(-5x + 3y = 30\)  
     \(5x + 6y = 15\)

112) \(-x + 3y = -13\)  
     \(-x - 4y = 8\)

113) \(-16x + 4y = 12\)  
     \(8x - y = -15\)

114) \(-3x - 4y = 8\)  
     \(5x - 10y = -30\)

115) \(20 = -2y + 8x\)  
     \(-32x + 14y + 20 = 0\)

116) \(33 = -3x + 18y\)  
     \(10 = -3x - 5y\)

117) You have $500 in the bank in an account that earns 3% annual interest. Assuming you will not take any money out of the account, how many years will it take till that account is worth more than $750?

118) You have $600 in the bank in an account that earns 3.5% annual interest compounded monthly. Assuming you will not take any money out of the account, how much will that account be worth after 5 years?

119) Mr. Rua’s motorcycle was worth $11,000 when he bought it. The value of the motorcycle depreciates (decays) by 7% every year. How much will the motorcycle be worth in seven years?

120) Ms. Wing has a photograph that is \(3x - 1\) inches wide and \(4x - 2\) inches tall. If the area of the pictures is 80 inches squared, what does \(x\) equal? What are the dimensions of the photograph?

121) Solve for \(x\).
     \(-3 = -2(x - 3)^2 + 5\)

122) Solve for \(x\).
     \(2x^3 + 49 = -5\)

123) Solve for \(x\).
     \(7x^3 + 9 = 51\)

124) Solve for \(x\).
     \(4 = 2(x + 5)^2 - 4\)
Answers to SUMMER MATH

1) Hope you read the directions!  2) -4  3) -1  4) -14  5) -12  6) 20  7) 25  8) -9m + 3  9) -3n - 16  10) -18r - 35r^2 - 28  11) -52 + 26x  12) \{-3\}  13) \{2\}  14) \{All\ real\ numbers.\}  15) \{-5\}  16) \{-6.1\}  17) \{1.853\}  18) \{2\}  19) \{0\}  20) No solution.  21) \{6\}  22) 54.4 mph  23) 22.4 km/h  24) 2%  25) 4 lb.  26) \{3, -5\}  27) \{10, 2\}  28) x > -1:  29) p \geq -6:  30) x < 5:  31) v \leq \frac{5}{2}:  32)  33)  34)  35)  36)  37)  38) y = -x + 2  39) y = 4  40) y = -\frac{3}{7}x - 5  41) y = -\frac{5}{3}x - 2  42) y = \frac{5}{4}x + 4  43) y = x + 4  44)  45)  46) y = \frac{4}{5}x + \frac{17}{5}  47) y = x
48) \( y = -\frac{1}{3}x + \frac{7}{3} \)

49) \( y = \frac{1}{9}x - \frac{41}{9} \)

50) \( y = -\frac{6}{5}x - \frac{9}{5} \)

51) \( y = \frac{1}{9}x - \frac{22}{9} \)

52)

53)

54) \( 11b^4 + 11b^3 - b + 4 \)

55) \(-9v^3 - 7v^2 - 4v - 11 \)

56) \(-6x^4 - 8x^2 - 9x - 8 \)

57) \(6x^3 + 1.1r^2 + 1.4r - 12.869 \)

58) \( n^2 + 8n + 15 \)

59) \( 30m^2 + 28m - 32 \)

60) \( 8b^2 + 63b - 8 \)

61) \( 6x^2 - 13x + 6 \)

62) \( 24r^2 + 35r + 4 \)

63) \( 4n^2 + 12n + 9 \)

64) \(-24x^2 - 14x + 5 \)

65) \(2.44x - 1.56 \)

66) \( 8\sqrt{2} \)

67) \( 3\sqrt{5} \)

68) \( 10\sqrt{2x} \)

69) \( 2k\sqrt{6k} \)

70) \(-2\sqrt{5} - \sqrt{3} \)

71) \(4\sqrt{6} \)

72) \(4\sqrt{6} - 6\sqrt{5} \)

73) \(3\sqrt{3} \)

74) \(2\sqrt{3} \)

75) \(3b^2 - \sqrt{10} \)

76) \(\frac{\sqrt{7}}{2} \)

77) \(\frac{\sqrt{6}}{3} \)

78) a) varies  
b) \(3x + (x + 3) + (x + 5) = 45; 7.4 \text{ ft}, 7.4 \text{ ft}, 7.4 \text{ ft}, 10.4 \text{ ft}, 12.4 \text{ ft} \)

79) 4 in. & 2 in.  
\(\frac{7}{6}\) feet & \(\frac{25}{6}\) feet

80) about 299 Valonia ventricosa

81) about 78 Valonia ventricosa

82) \(a^8 \)

83) \(a^2 \)

84) \(\frac{y^5}{3x^9} \)

85) \(a^{10} \)

86) \(9x^6y^8 \)

87) \(\frac{3x^6}{25y^2} \)

88) \(\frac{3x^6}{25y^2} \)

89) \(\frac{1}{6} \)

90) \(\frac{71}{20} \)

91) \(\{9, -9\} \)

92) \(\{9, -9\} \)

93) \(\{7.211, -7.211\} \)

94) \(\{9.539, -9.539\} \)

95) \(\{1, -5\} \)

96) \(\{2, 5\} \)

97) \(\{6, -4\} \)

98) \(\{-5, 5\} \)

99) \(\{6, 2\} \)

100) \(\{-7, 3\} \)

101) \(\left\{\frac{10}{3}, -\frac{3}{2}\right\} \)

102) \(\{5, -2\} \)

103) \(\left\{6, -\frac{15}{2}\right\} \)

104) \(\left\{\frac{23}{4}, -3\right\} \)

105) \(\{1.87, -1.07\} \)

106) \(\{2.475, -0.808\} \)

107) \(\{5, -1\} \)

108) \(\{0, 3, -2\} \)

109) \(\{4, -2\} \)

110) \(\{-3, -2\} \)

111) \(\{-3, 5\} \)

112) \(\{4, -3\} \)

113) \(\{-3, -9\} \)

114) \(\{-4, 1\} \)

115) \(\{5, 10\} \)

116) \(\{-5, 1\} \)

117) 14 years  
118) $714.57

119) $6618.71

120) 3 inches; 8 x 10 inches  
121) \(x = 1, 5\)

122) \(x = -3\)

123) 1.817

124) \(x = -3, -7\)