

Booker T. Washington Summer Math Packet 2017

Completed by Thursday, August 24, 2016

Go to the BTW website (<http://btw.tulsaschools.org/>) then click the summer assignments (beach ball) and choose the course that you are enrolled in for the 2016-17 school year.

Helpful websites:

<http://patrickjmt.com/>

Free site with video lectures

<http://www.khanacademy.org/>

Free site with video lectures

<http://tutorial.math.lamar.edu/Classes/Alg/Alg.aspx>

Free site with notes and problems

www.pearsonsuccessnet.com

Site from textbook publisher Pearson (Only available to students who have access from prior years)

Name: _____

14. A water park offers a season pass for \$64 per person which includes free admission and free parking. Admission for the water park is \$14.50 per person. Parking is normally \$5 for those without a season pass.

- How many visits to the water park would you have to use for the season pass to be a better deal?
- What would the total cost be for 3 visits with and without a season pass?

Solve each proportion. Use the Multiplication Property of Equality or the Cross Product Property. Explain your choice.

15. $\frac{1}{a} = \frac{6}{18}$

16. $\frac{x+1}{15} = \frac{-4}{5}$

17. $\frac{2}{q} = \frac{8}{q+12}$

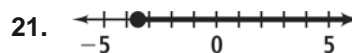
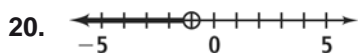
Define a variable and write an equation for each situation. Then solve.

18. The scale of a map is 1 in. : 75 km. Determine the distance between two towns that are 5.6 in. apart on the map.

19. A flagpole casts a 32-ft shadow. A boy who is 6 feet tall is standing near the flagpole casting a 16-ft shadow. They form similar triangles. How tall is the flagpole?

Part 3 Algebraic Inequalities

Write an inequality for each graph.



Solve each inequality. Graph the solution.

22. $|r + 3| \geq 7$

23. $|6q + 9| \leq 9$

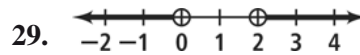
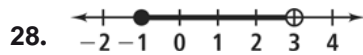
24. $-3 < 5c + 7 < 22$

25. $-6b > 42$ or $4b > -4$

26. $3x - 8 < -2x + 22$

27. $2|d + 5| - 1 < 3$

Write a compound inequality that each graph could represent.



Solve each equation. Check your solutions.

30. $|5x + 13| = -7$

31. $2 = |w - 13|$

32. $|4x + 1| - 3 = 26$

Part 4 Linear Functions

Find the slope of the line that passes through each pair of points.

33. $(-3, -1), (-1, 5)$

34. $\left(\frac{3}{4}, 5\right), \left(\frac{5}{4}, 2\right)$

Graph each equation.

35. $x + 2y = 6$

36. $y = \frac{1}{2}x - 3$

37. $y - 2 = -2(x - 3)$

Write each equation in slope-intercept form.

38. $6x + 9y = 27$

39. $7x = 3y - 12$

Write an equation in point-slope form for the line that has the given slope m and that passes through the given point.

40. $m = \frac{1}{4}; (0, -2)$

41. $m = -2; (0, 1)$

Write an equation in slope-intercept form for the line that passes through the given points.

42. $(2, 3), (1, 5)$

43. $(5, -2), (-16, 4)$

Write an equation in Standard form $Ax + By = C$ (no fractions or decimals) for the line that passes through the given points.

44. $(2, 1), (1, 5)$

45. $(5, -2), (-10, 4)$

Write an equation in slope-intercept form for the line that passes through the given point and is parallel to the given line.

46. $(-3, 5); y = -\frac{1}{2}x + 4$

47. $(-7, 3); x = 4$

Write an equation in slope-intercept form for the line that passes through the given point and is perpendicular to the given line.

48. $(5, -1); y = 4x - 7$

49. $(4, -2); y = 3$

50. The debate club needs \$240.00 to attend a debate tournament. The club decides to sell cups of iced tea and lemonade at baseball games. Iced tea will be sold for \$.50 per cup and lemonade will be sold for \$.80 per cup.
- Write an equation to find how many cups of each beverage must be sold to raise \$240.00.
 - Graph the equation. What are the x - and y -intercepts?

Part 5 Linear Systems & Inequalities

Solve each system

51.
$$\begin{aligned} 3x - 5y &= -1 \\ x - y &= -1 \end{aligned}$$

52.
$$\begin{aligned} x + 2y &= -1 \\ 2x - 3y &= 12 \end{aligned}$$

Solve each system

53. $-2x + 3y = 9$

54. $x + y = 7$

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$2x - 2y = -4$

$3x - 2y = 11$

Graph each inequality in the coordinate plane.

55. $2x + 3y \leq 6$

56. $2x - y \geq 1$

57. $-3x + 2y < 5$

Solve each system of inequalities by graphing.

58. $2x + 3y \leq 6$

$3x + 2y \leq 6$

59. $5x + y > 10$

$2x + y < 15$

Part 6 Exponents

Simplify each expression. Use positive exponents.

60. $a^4b^{-7}c^0$

61. $\frac{p^3q^{-1}}{q^2r^{-6}}$

62. $(m^3n^{-5}m^{-1})^{-3}$

63. $\left(\frac{x^4y^{-2}}{x^{-3}y^5}\right)^{-1}$

64. $u^{-5}v^4(-u^3v^{-2})^3$

65. The function $y = 41 \cdot 0.95^x$ models the difference (in minutes) between men's and women's finishing times for the Boston Marathon. The number of years since women first officially ran the race in 1972 is represented by x .

- Does the exponential function represent *growth* or *decay*?
- Estimate the difference between finishing times in 1990.
- Predict the difference between finishing times in 2015.

Part 7 Factoring

Simplify each product.

66. $(x + 6)^2$

67. $(5s - t)^2$

68. $(3p^2 + 10q)(3p^2 - 10q)$

Factor each expression.

69. $r^2 + 12r + 27$

70. $g^2 - 8g - 48$

71. $m^2 + 2m - 35$

72. $3d^2 - 13d + 12$

73. $8y^2 + 60y + 72$

74. $9w^2 - 75w - 54$

Factor completely.

75. $6n^3 - 24n^2 + n - 4$

76. $2p^4 + 6p^3 - 8p^2 - 4p$

77. $8h^2 + 36h + 16$

78. A cereal box in the shape of a rectangular prism has a volume of $18x^3 - 3x^2 - 6x$. What are three possible linear expressions for the dimensions of the cereal box?

79. The area of a rectangular serving tray is $3x^2 + 17x - 56$. The width of the tray is $x + 8$. What is the length of the tray?

Part 8 Quadratics

Solve each equation. If necessary, round to the nearest hundredth. (Factor, Square Root method or Quadratic Formula)

80. $5x(x + 2) = 0$

81. $x^2 + 8x + 15 = 0$

82. $(x - 5)(2x + 1) = 0$

83. $x^2 = 10x$

84. $x^2 - 7x = -12$

85. $2x^2 + 5x - 63 = 0$

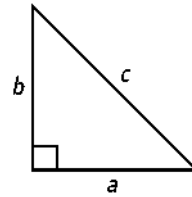
Part 9 Radicals

Use the triangle at the right. Find the length of the missing side.

86. $a = 16, b = 63$

87. $b = 2.1, c = 2.9$

88. $a = 65, c = 97$



89. How long is the diagonal of a 9-in. by 40-in. rectangle?

Simplify each radical expression. Do not use decimals, do not use the calculator.

90. $\sqrt{150}$

91. $\sqrt{45n^5}$

92. $\sqrt{2x^3} \cdot \sqrt{6x^2} \cdot \sqrt{10x}$

Simplify each sum or difference. Do not use decimals, do not use the calculator.

93. $3\sqrt{7} + 8\sqrt{7}$

94. $14\sqrt{5} - 10\sqrt{5}$

95. $25\sqrt{7} - 2\sqrt{63}$

Simplify each product or quotient. Do not use decimals, do not use the calculator.

96. $\sqrt{7}(\sqrt{14} + \sqrt{3})$

97. $2\sqrt{3}(2 - \sqrt{6})$

98. $\frac{12}{\sqrt{5} - \sqrt{2}}$

Part 10 Rational Expressions

Simplify each expression. State any excluded values.

99. $\frac{6x - 48}{2x - 16}$

100. $\frac{3a^2 + 2a - 1}{a^2 - 1}$

101. $\frac{4 + x}{x^2 + 5x + 4}$

Multiply or divide.

102. $\frac{2x+4}{x+2} \cdot \frac{x^2+5x+6}{6x^2+18x}$

103. $\frac{2n-1}{n^2-4} \div \frac{n^2}{n+2}$

104. $\frac{4a^2 + 4a - 3}{2a + 3} \div \frac{2a - 1}{a}$

Add or subtract.

105. $\frac{5}{x} + \frac{3}{x-1}$

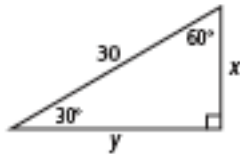
106. $\frac{4}{m} - \frac{1}{2-m}$

107. $\frac{3-d}{d} - \frac{d+4}{2d}$

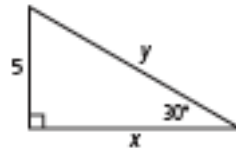
Part 11 Trigonometry and Vectors

Find the value of each variable. Express in simplest radical form.

108.



109.



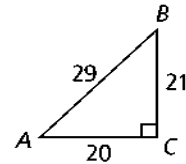
Write each ratio.

110. $\sin A$

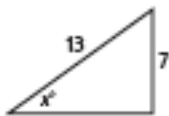
111. $\cos A$

112. $\tan A$

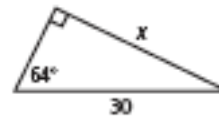
113. $\sin B$

Find the value of x to the nearest tenth.

114.



115.



116. A fire ranger stands at an observation window 70 ft above the ground. She sees a fire in the distance. She takes a reading of the angle of depression and finds it to be 24° . To the nearest tenth of a foot, how far away from the base of the tower is the fire?

