WJHS Summer Math Packet
For Rising Algebra 2/Honors Algebra 2 Students

This packet is an optional review of the skills that will help you be successful in Algebra 2. By completing this packet over the summer, you will not only keep your brain mathematically active but you will be able to identify skills that you need to strengthen for your year ahead. Complete the exercises then check your answers with the Answer Key. If you struggle with any of the exercises, please seek help from a friend, parent, sibling, book, or online resource (some suggestions have been provided for you). Enjoy your math review and we look forward to meeting you in August!

I. Operations on Numbers

Rational Numbers http://www.mathsisfun.com/rational-numbers.html

Simplify.

1. $84+(-90)=$ -6

2. $\frac{-12}{30}=$ $-\frac{2}{5}$

3. $-\frac{3}{4}+\frac{5}{4}=$ $\frac{1}{2}$

4. $-\frac{2}{3}-\frac{1}{4}=$ $-\frac{11}{12}$

5. $-\frac{1}{5}-\left(-\frac{4}{7}\right)=$ $\frac{13}{35}$

6. $\left(\frac{2}{3}\right)\left(-\frac{15}{16}\right)=$ $-\frac{5}{8}$

7. $\left(-\frac{1}{2}\right)\left(-\frac{1}{3}\right)\left(-\frac{3}{4}\right)=$ $-\frac{1}{8}$

8. $\frac{-6(-6+2)}{-10+(-2)}=$ -2

9. $\left(-\frac{3}{4}\right)\left(\frac{1}{2}\right)=$ $-\frac{3}{8}$

10. $-\frac{15}{32}+\left(-\frac{3}{10}\right)=$ $\frac{25}{16}$

11. $\frac{57y-12}{3}=$ $19y-4$

Order of Operations http://www.themathpage.com/alg/algebraic-expressions.htm#order

Simplify each expression using PEMDAS.

12. $\left[(12-14)-10^2+2\right]+5^2$ -4

13. $\frac{50-(8-9)+\frac{12}{4}}{4^2-7}$ 6

Evaluate.

14. b^2-4ac if $a=3, b=-5, c=-1$ 37

15. $mx+b$ if $m=-\frac{2}{5}, b=-\frac{3}{10}, x=-1$ $\frac{1}{10}$

II. Linear Equations in One Variable http://www.themathpage.com/alg/equations.htm

Solve each linear equation. A solution is a value for the variable that makes the equation true. You should check each solution to verify that it makes the left side of the equation equal to the right side.

16. $8-5w=-37$ $w=9$

17. $\frac{b+1}{3}=2$ $b=5$

18. $\frac{5}{2}c-8=-3$ $c=2$

19. $-\frac{h}{3}-4=13$ $h=-51$

20. $2.5g+0.45=0.95$ $g=0.2$

21. $8+4k=-10+k$ $k=-6$

22. $\frac{2}{3}n+8=\frac{1}{2}n+2$ $n=-36$

23. $-7(2d-4)=5(6-2d)$ $d=-\frac{1}{2}$

24. $\frac{1}{9}(2m-16)=\frac{1}{3}(2m+4)$ $m=-7$

25. $2(a+8)+7=5(a+2)-3a-19$ NO SOLUTION

26. $\frac{3}{7}=\frac{x-2}{6}$ $x=\frac{32}{7}$

27. Solve for x in terms of b and c.

$2x+b=c$ $x=\frac{c-b}{2}$

28. Solve for z in terms of a and b.

$\frac{b-4z}{7}=a$ $z=\frac{b-7a}{4}$

29. Solve for w in terms of y.

$2w-y=7w-2$ $w=\frac{2-y}{5}$

III. Linear Equations in Two Variables http://www.themathpage.com/alg/equations.htm

Slope: Find the slope of the line that passes through the two points. If the slope does not exist, write *no slope.*

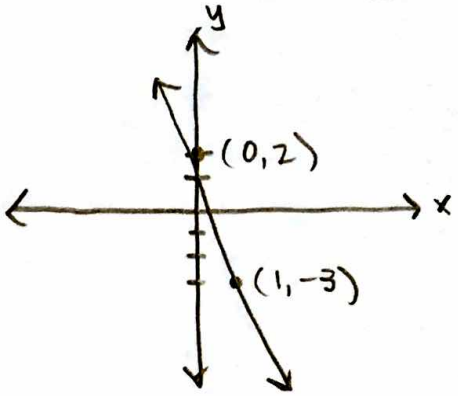
30. (14,-8) and (7,-6) $\frac{-2}{7}$ 31. (4,-3) and (8,-3) 0 32. (-2,4) and (-2,9) no slope OR undefined

Slope-Intercept Form

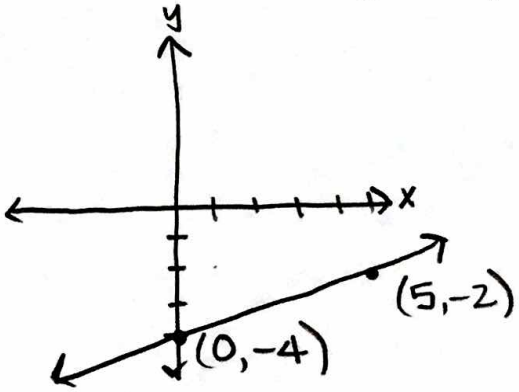
33. Write the equation of the line whose slope is $-\frac{3}{2}$ and whose y-intercept is 5. $y = -\frac{3}{2}x + 5$

State the slope and y-intercept then graph each line. Label the y-intercept and a second point on each line.

34. $y = -5x + 2$ $m = -5$ $b = 2$

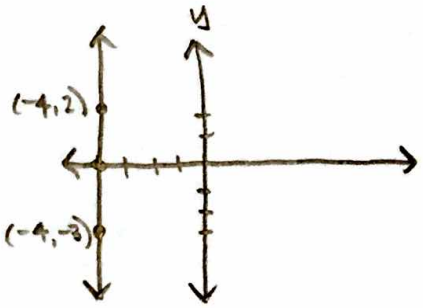


35. $y = \frac{2}{5}x - 4$ $m = \frac{2}{5}$ $b = -4$

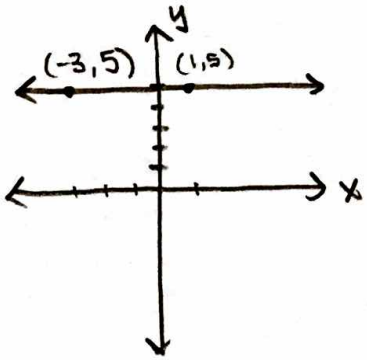


Graph each horizontal or vertical line. Label two points on each line.

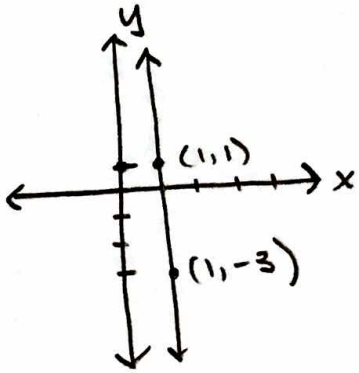
36. $x = -4$



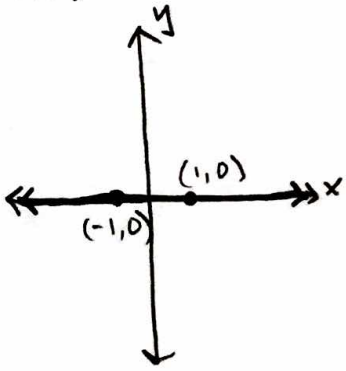
37. $y = 5$



38. $x = 1$



39. $y = 0$



40. Use slope-intercept form to write the equation of the line whose x-intercept is -3 and whose y-intercept is 6.

$y = 2x + 6$

41. Use slope-intercept form to write the equation of the line that passes through the points (-1,6) and (3,-2).

$y = -2x + 4$

IV. Systems of Linear Equations

http://www.themathpage.com/alg/simultaneous-equations.htm#addition

Solve each system using the indicated method. If there is no solution or an infinite number of solutions, state so and explain why.

42. $\begin{cases} x + y = 1 \\ y = \frac{1}{3}x + 5 \end{cases}$ $(-3, 4)$

43. $\begin{cases} 2x + 2y = 7 \\ x - 2y = -1 \end{cases}$ $\left(2, \frac{3}{2}\right)$

44. $\begin{cases} 3x + 2y = -1 \\ 4x + 2y = -6 \end{cases}$ $(-5, 7)$

45. $\begin{cases} 4x + 5y = 6 \\ 6x - 7y = -20 \end{cases}$ $(-1, 2)$

V. Exponents http://www.themathpage.com/alg/exponents.htm
http://www.themathpage.com/alg/negative-exponents.htm

Simplify.

46. $(-6)^0 =$ 1

47. $c^4 \cdot c^2 \cdot c =$ c^7

48. $(-4x^3)(-5x^7) =$ $20x^{10}$

49. $(n^2)^5 =$ n^{10}

50. $(7x^6)^2 =$ $49x^{12}$

51. $(-5n)^3 =$ $-125n^3$

52. $(4a^3b)^2(b^3) =$ $16a^6b^5$

53. $(-18m^2n)^2\left(\frac{1}{6}mn^2\right) =$ $54m^5n^4$

54. $\frac{6^5}{6^3} =$ 6^2 OR 36

55. $\frac{-2y^7}{14y^5} =$ $\frac{-y^2}{7}$

56. $\frac{-6m}{15m^3} =$ $\frac{-2}{5m^2}$

57. $\frac{x^5y^3}{xy^7} =$ $\frac{x^4}{y^4}$ OR $\left(\frac{x}{y}\right)^4$

58. $\left(\frac{2}{5}\right)^3 =$ $\frac{8}{125}$

59. $\left(-\frac{3}{7}\right)^2 =$ $\frac{9}{49}$

VI. Simplifying Polynomials

60. $(2m^2+5m-1)+(4m^2-8m-6)$

$6m^2-3m-7$

61. $(n^2+3n+2)-(2n^2-6n-2)$

$-n^2+9n+4$

62. $-4x(2x^3-2x+3)$

$-8x^4+8x^2-12x$

63. $2b(b^2+4b+8)-3b(3b^2+9b-18)+5b^2$

$-7b^3-14b^2+70b$

C. Find each product using the FOIL or box method.
http://www.themathpage.com/alg/quadratic-trinomial.htm

64. $(x+5)(x+7)$

$x^2+12x+35$

65. $(x-6)(x-2)$

$x^2-8x+12$

66. $(x+8)(x-5)$

$x^2+3x-40$

67. $(x+4)(x-4)$

x^2-16

68. $(x+4)(x+4)$

$x^2+8x+16$

69. $(c-8)^2$

$c^2-16c+64$

70. $(3d+1)^2$ $9d^2+6d+1$

71. $(2x-1)(x+5)$ $2x^2+9x-5$

72. $(7g+4)(7g-4)$ $49g^2-16$

VII. Factoring Polynomials

http://www.wtamu.edu/academic/anns/mps/math/mathlab/col_algebra/col_alg_tut7_factor.htm

https://www.khanacademy.org/math/algebra-basics/quadratics-polynomials-topic/factoring-quadratic-expressions-core-algebra/v/factoring-quadratic-expressions

https://www.khanacademy.org/math/algebra-basics/quadratics-polynomials-topic/factoring-quadratic-expressions-core-algebra/v/factoring-trinomials-with-a-common-factor

Factor each polynomial using the Distributive Property. In other words, by factoring out the GCF.

73. $24x+16$ $8(3x+2)$

74. $14y^3-28y^2+y$ $y(14y^2-28y+1)$

Trinomials in the Form ax^2+bx+c, where $a=1$. Factor each trinomial into two binomials. If not factorable, write PRIME.

75. $m^2+12m+32 =$ $(m+8)(m+4)$

76. $r^2-3r+2 =$ $(r-2)(r-1)$

77. $x^2-4x-21 =$ $(x-7)(x+3)$

78. $x^2+8x-16 =$ Prime

79. $m^2+4m-12 =$ $(m+6)(m-2)$

80. $d^2+63-16d =$ $(d-9)(d-7)$

81. $48-16g+g^2 =$ $(g-12)(g-4)$

Trinomials in the Form ax^2+bx+c, where $a\neq 1$. Factor each trinomial into two binomials. If not factorable, write PRIME.

82. $2x^2+5x+3 =$ $(2x+3)(x+1)$

83. $3m^2-8m-3 =$ $(3m+1)(m-3)$

84. $4c^2-19c+21 =$ $(4c-7)(c-3)$

85. $2t^2 - 11t + 15 =$ $(2t-5)(t-3)$

86. $4n^2 + 8n - 5 =$ $(2n+5)(2n-1)$

87. $2x^2 + 3x - 6 =$ prime

Factor each difference of squares. If not factorable, write PRIME.

88. $x^2 - 81 =$ $(x+9)(x-9)$

89. $4n^2 - 25 =$ $(2n+5)(2n-5)$

90. $-49 + c^2 =$ $(c+7)(c-7)$

91. $d^2 + 4e^2 =$ prime

VIII. Quadratic Formula

http://www.regentsprep.org/Regents/math/algtrig/ATE3/quadformula.htm

Solve each equation using the Quadratic Formula. If $ax^2 + bx + c = 0$, then $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

92. $5x^2 + 3x - 1 = 0$ $x = \dfrac{-3 \pm \sqrt{29}}{10}$

93. $x^2 + 4x = -20$ $x = \dfrac{-4 \pm \sqrt{-64}}{2}$ no real solutions

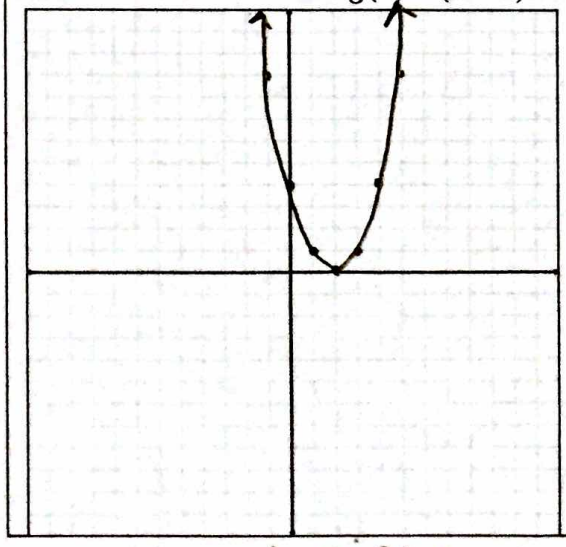
94. $-7x^2 + 2x = -9$ $x = 1$ OR $x = \dfrac{9}{7}$

IX. Graphing: Identify the transformations from the parent function. Then graph the function.

http://www.purplemath.com/modules/fcntrans.htm

Parent Function: $f(x) = x^2$

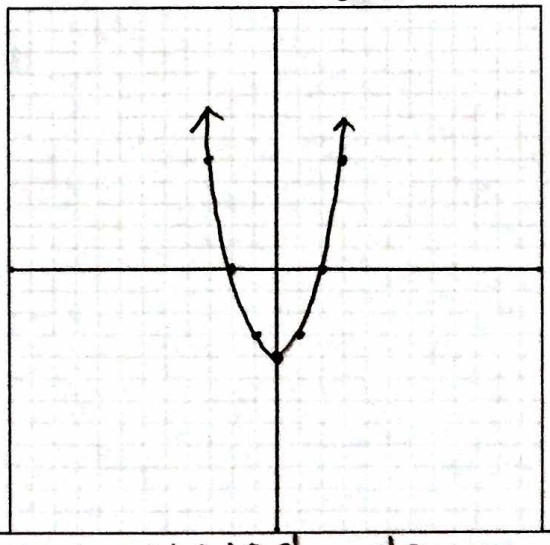
Transformed Function: $g(x) = (x-2)^2$



translated right 2 units

Parent Function: $f(x) = x^2$

Transformed Function: $g(x) = x^2 - 4$



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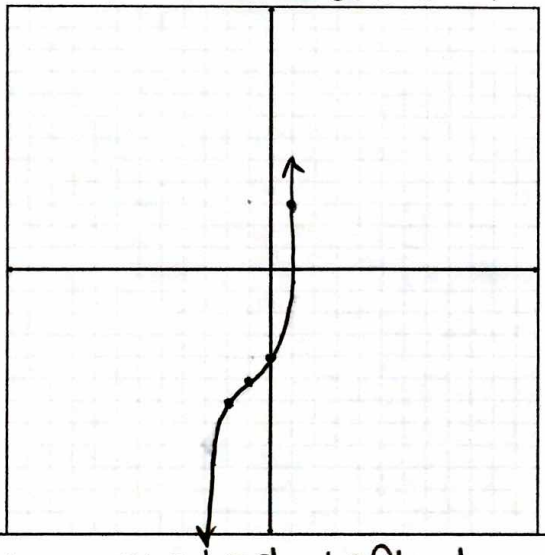
Parent Function: $f(x) = x^3$

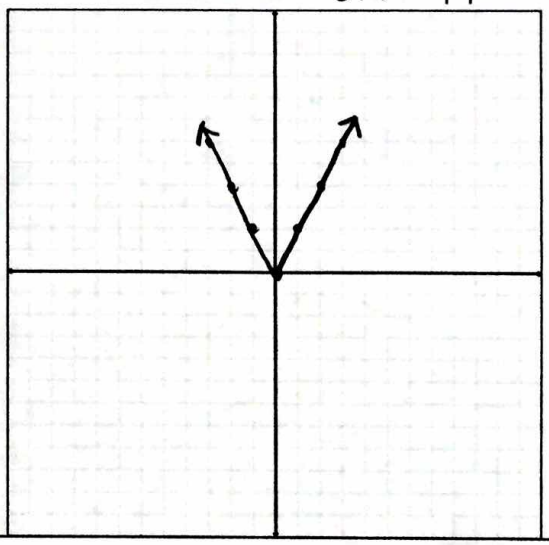
Transformed Function: $g(x) = (x+1)^3 - 5$



translated left 1 unit and down 5 units.

Parent Function: $f(x) = |x|$

Transformed Function: $g(x) = 2|x|$



dilated vertically by a factor of 2.