RVGS Summer Assignment
For Rising Algebra II Students

Introduction: This set of practice problems provides a review of Algebra I topics that will help you be successful in Algebra II. By completing this review during the summer, you will keep your brain mathematically active, and identify concepts and skills that you need to strengthen for your year ahead.

Instructions:

1. Complete all exercises on notebook paper without using a calculator.
2. Please title the notebook pages with the review number and your name.
3. Write the original problem and show all the steps you used.
4. You may not get help from another person, such as a tutor, teacher, peer, or family member.
5. If you need help, please use the suggested resources linked on this document. You may also use other online resources or textbooks.
6. Place all of your review papers in a folder or notebook. Please bring the folder which contains your written work to Orientation. We look forward to meeting you in August!

Three suggested online resources:

http://www.themathpage.com/alg/algebra.htm
http://patrickjmt.com/
https://www.khanacademy.org

I. Operations on Numbers

A. Absolute Value

http://www.mathsisfun.com/numbers/absolute-value.html

Evaluate.

1. $|-x|+1\frac{1}{2}$ if $x=\frac{1}{2}$ _____

2. $14-|c|$ if $c=-10$ _____

B. Rational Numbers

https://www.khanacademy.org/math/cc-seventh-grade-math

Simplify.

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

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

5. $-\frac{15}{32}\div\left(-\frac{3}{10}\right)=$ _____

6. $\frac{57y-12}{3}=$ _____

Evaluate.

https://www.khanacademy.org/math/in-seventh-grade-math/algebraic-expressions/finding-value-expression/v/evaluating-expressions-in-two-variables

7. $-3cd$ if $c=\frac{1}{2}, d=-\frac{2}{3}$ _____

8. $c^2\left(-\frac{1}{3}\right)$ if $c=-6$ _____

C. Radicals

https://www.khanacademy.org/math/algebra-basics/core-algebra-foundations/square-roots-for-college/v/understanding-square-roots

Simplify.

9. $-\frac{2}{3}\sqrt{\frac{25}{16}}=$ _____

10. $\sqrt{72}\bullet\sqrt{6}=$ _____

D. Exponents

http://www.themathpage.com/alg/algebraic-expressions.htm#powers

Simplify.

11. $(-4)^2=$ _____

12. $-5^2=$ _____

13. $\left(-\frac{3}{4}\right)^2=$ _____

E. Order of Operations

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

Evaluate each expression using PEMDAS.

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

15. $\dfrac{50-(8-9)+\dfrac{12}{4}}{4^2-7}$ _____

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

17. $mx+b$ if $m=-\dfrac{2}{5}, b=-\dfrac{3}{10}, x=-1$ _____

II. Linear Equations in One Variable

http://patrickjmt.com/an-intro-to-solving-linear-equations-what-does-it-mean-to-be-a-solution/

http://patrickjmt.com/an-intro-to-solving-linear-equations-solving-some-basic-linear-equations/

http://patrickjmt.com/an-intro-to-solving-linear-equations-solving-some-basic-linear-equations-ex-2/

http://patrickjmt.com/solving-linear-equations/

http://patrickjmt.com/solving-linear-equations-example-1/

http://patrickjmt.com/solving-a-basic-linear-equation-example-2/

http://patrickjmt.com/solving-a-basic-linear-equation-example-3/

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.

18. $\dfrac{b+1}{3}=2$ _____

19. $-\dfrac{h}{3}-4=13$ _____

20. $2.5g + 0.45 = 0.95$ _____

21. $\frac{2}{3}n + 8 = \frac{1}{2}n + 2$ _____

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

23. $2(a + 8) + 7 = 5(a + 2) - 3a - 19$ _____

24. $\frac{3}{7} = \frac{x - 2}{6}$ _____

25. Solve for z in terms of a and b. $\frac{b - 4z}{7} = a$

26. Solve for w in terms of y. $2w - y = 7w - 2$ _____

27. Solve for x in terms of y. Eight less than a number x is three more than a number y.

_____

III. Linear Equations in Two Variables

A. Slope

http://patrickjmt.com/finding-the-slope-of-a-line/

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

28. (14,-8) and (7,-6) _____ 29. (4,-3) and (8,-3) _____ 30. (-2,4) and (-2,9) _____

B. Slope-Intercept Form

http://patrickjmt.com/graphing-a-line-using-a-point-and-slope/

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

_____

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

32. $y = -5x + 2$

33. $y = \frac{2}{5}x - 4$

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

34. $x = -4$

35. $y = 5$

http://patrickjmt.com/find-the-equation-of-a-line-using-point-slope-form/

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

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

IV. Systems of Linear Equations

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

A solution to a system of equations is an ordered pair (x, y) that makes both equations true.

38. Is (-2,1) a solution to the system $\begin{cases} 4x + 2y = -6 \\ x + y = -3 \end{cases}$? Why or why not?

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

39. $\begin{cases} x + y = 1 \\ y = \frac{1}{3}x + 5 \end{cases}$ graphing

40. $\begin{cases} 2x + 2y = 7 \\ x - 2y = -1 \end{cases}$ substitution

41. $\begin{cases} 3x + 2y = -1 \\ 4x + 2y = -6 \end{cases}$ elimination

42. $\begin{cases} 4x + 5y = 6 \\ 6x - 7y = -20 \end{cases}$ elimination

V. Power Rules

http://www.themathpage.com/alg/exponents.htm

http://www.themathpage.com/alg/exponents-2.htm

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

Simplify.

43. $(-6)^0$ = _____

44. $c^4 \cdot c^2 \cdot c$ = _____

45. $(-4x^3)(-5x^7)$ = _____

46. $(7x^6)^2$ = _____

47. $(-5n)^3$ = _____

48. $(-18m^2n)^2\left(\frac{1}{6}mn^2\right)$ = _____

49. $\frac{6^5}{6^3}$ = _____

50. $\frac{x^5y^3}{xy^7}$ = _____

51. $\left(\frac{5}{3}\right)^{-2}$ = _____

52. $\left(-\frac{3}{7}\right)^2$ = _____

53. $\left(\frac{4a^2b^3}{ab}\right)^2$ = _____

54. 5^{-2} = _____

55. $(3x)^{-3}$ = _____

56. $\frac{g^{-7}}{g^4}$ = _____

57. $\frac{15x^6y^{-8}}{5xy^{-11}}$ = _____

VI. Simplifying Polynomials

A. Definitions

http://www.themathpage.com/alg/factoring.htm#poly

58. Define a) monomial, b) binomial, c) trinomial, and d) polynomial.

59. Write the polynomial $x + 3x^4 - 21x^2 - 6 + x^3$ in standard form. Then state the degree of each term and the degree of the polynomial.

B. Simplify.

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

61. $2b(b^2 + 4b + 8) - 3b(3b^2 + 9b - 18) + 5b^2$

C. Find each product using the FOIL.

http://www.themathpage.com/alg/quadratic-trinomial.htm

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

63. $(3x + 8y)(2x - 5y)$

64. $(a + b)^2$

65. $(3x^2 - 1)(2x + 1)$

66. $(3d + 1)^2$

67. $(7g + 4)(7g - 4)$

VII. Factoring Polynomials

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

A. Find the GCF of each set of monomials.

68. 32, 54 _____

69. $24fg^5$, $56f^3g$ _____

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

70. $14y^3 - 28y^2 + y$ _____

Factor out -1 as the GCF so that the squared term is positive.

71. $-3x^2 - 6x + 4$ _____

Factor each polynomial by grouping.

72. $12a^2 + 3a - 8a - 2$ _____

VII. Factoring Polynomials

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

B. Trinomials in the form $ax^2 + bx + c$, where $a = 1$.

Factor each trinomial into two binomials. If not factorable, write PRIME.

73. $x^2 - 4x - 21$ = _____

74. $x^2 + 8x - 16$ = _____

75. $48 - 16g + g^2$ = _____

C. Trinomials in the form $ax^2 + bx + c$, where $a \neq 1$.

Factor each trinomial into two binomials. If not factorable, write PRIME.

76. $3m^2 - 8m - 3$ = _____

77. $2x^2 + 3x - 6$ = _____

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

78. $x^2 - 81$ = _____

79. $4n^2 - 25$ = _____

80. $-49 + c^2$ = _____

81. $d^2 + 4e^2$ = _____

E. A perfect square trinomial has the form $a^2 \pm 2ab + b^2$, where a and b are real numbers, and is
the result of squaring $a \pm b$. Tell whether each trinomial is a perfect square. If so, factor it.

82. $x^2 + 22x + 121$ _____; _____

83. $p^2 + 8p + 64$ _____; _____

84. $25c^2 + 10c + 1$ _____; _____

VII. Factoring Polynomials

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

F. A prime number is a number that has exactly two factors, one and itself. Likewise, a prime polynomial is a polynomial that has exactly two factors, one and itself. Factor each polynomial completely so that each factor in your answer is prime. Always start with factoring out a GCF, if one exists.

85. $3b^2 - 27b + 24$ = _____

86. $6g^3 - 14g^2 + 4g$ = _____

87. $3m^3 - 300m$ = _____

VIII. Quadratic Formula

http://www.mesacc.edu/~scotz47781/mat120/notes/quad_formula/quad_formula.html

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

88. $x^2 + 4x + 20 = 0$

89. $-7x^2 + 2x = -9$