Greetings from the Land of Algebra 2,

The mathematical "step" from Geometry to Algebra 2 can be very challenging if students have trouble remembering the material covered in Algebra 1. The Algebra 2 staff met and came up with a brief review of topics that we have found to be areas students most commonly struggle to remember. We created a concise Algebra overview to help students be successful in bridging the knowledge gap that often occurs between Geometry and Algebra 2. **This assignment is not mandatory but highly recommended.**

This three-page Algebra overview can be turned in as an **extra credit** assignment to your regular Algebra 2 or Algebra 2 Daily teacher the first week of school. The purpose of this review is to remind you of vital Algebra skills necessary to succeed in Algebra 2. Mastering these core concepts will greatly improve your ability to do well in this rigorous course—and starting the school year with some extra credit is never a bad idea. If you need help remembering any of the topics, watch the associated videos (listed at the end of this packet).

We would like to suggest that after a healthy break from school, (say sometime in July) you encourage your students to take the time to work through the Algebra review. This is not required, but we truly believe that it will make the learning curve for next year's math classes feel less steep. This review should help cut down on anxiety, stress and the amount of time homework will take.

Our hope is that you have a restful summer, and that everyone returns to school refreshed and ready to enter the exciting realm of Algebra 2.

We are looking forward to meeting you in the fall!

—The Algebra 2 Teaching Team

Name _____

Period_____

Essential Algebra Summer Review

The purpose of this review is to remind you of vital algebra skills necessary to succeed in Algebra 2. Mastering these core concepts will greatly improve your ability to do well in this rigorous course. If you need help remembering any of the topics, watch the associated videos (listed at the end of the packet). We are looking forward to meeting you in the fall! – The Algebra 2 teaching team ☺

Directions: Do your work on a separate sheet of paper, **box answers**, and show **ALL** work.

Order of Operations: Evaluate each expression.

1. $9 - 32 \div 4$
2. $8 \times \frac{15}{5} - (5 + 9)$
3. $(2 + 6 \times 2 + 2 - 4) \times 2$
4. $20 \div (4 - (-10 + 8))^2$

Properties of Exponents: Simplify. Your answer should contain only positive exponents.

5. $2k^4 \cdot 4k$
6. $4v^3 \cdot vu^2$
7. $(4a^3)^2$
8. $(2x^0y^2)^{-3} \cdot 2yx^3$
9. $\frac{2x^4y^{-4}z^{-3}}{3x^2y^{-3}z^4}$
10. $\frac{2x^2y^4 \cdot 4x^2y^4 \cdot 3x}{3x^{-3}y^2}$

Multiplying Polynomials: Find each product.

11. $6v(2v + 3)$
12. $(x + 3)(x - 3)$
13. $(x + 3)(6x - 2)$
14. $(4n + 1)(2n + 6)$
15. $(2p - 1)^2$

Factoring Quadratic Polynomials: Factor.

16. $a^2 + 11a + 18$
17. $n^2 - n - 56$
18. $x^2 + 4x - 12$
19. $2v^2 + 11v + 5$
20. $5x^2 - 18x + 9$

Radical Expressions: Simplify.

21. $\sqrt{64x^2y^2}$

22. $2\sqrt{8p^2q^2r}$

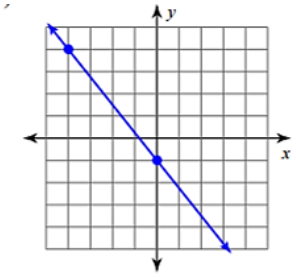
23. $\sqrt{20x^2} \cdot \sqrt{20x}$

24. $\sqrt{3v}\,(\sqrt{6} + \sqrt{10})$

25. $\dfrac{\sqrt{4}}{5\sqrt{3}}$

Finding the Slope of a Line:

- From a graph:

26. 

- From an equation

27. $y = \frac{7}{2}x - 2$

28. $6x + 5y = 20$

- Find the slope of the line through each pair of points

29. $(3, -20), (5, 8)$

30. $(12, -18), (-15, -18)$

Graphing Lines, Inequalities, and Absolute Values: Sketch the graph of each function.

31. $y = \frac{7}{2}x - 2$

32. $6x + 5y = 20$

33. $y > -x - 5$

34. $y = |x| + 2$

35. $y = |x + 2|$

Solving Systems of Equations:

- Solve each system by elimination.

36. $x - y = 11$
$2x + y = 19$

37. $-4x + 9y = 9$
$x - 3y = -6$

- Solve each system by substitution.

38. $-7x - 2y = -13$
$x - 2y = 11$

39. $y = 5x - 7$
$-3x - 2y = -12$

- Sketch the solution to the system of inequalities.

40. $x \leq -3$
$y > -\frac{5}{3}x - 2$

Word Problems: Solve.

41. 41% of 78 is what?

42. What percent of 38 is 15?

43. Find the value of two numbers if their sum is 12 and their difference is 4.

44. Working alone, Ryan can dig a 10 ft. by 10 ft. hole in five hours. Castel can dig the same hole in six hours. How long would it take them if they worked together?

45. An aircraft carrier made a trip to Guam and back. The trip there took three hours and the trip back took four hours. It averaged 6 km/h on the return trip. Find the average speed of the trip there.

Video Help for Each Topic

Order of Operations (Questions 1-4)

https://www.khanacademy.org/math/pre-algebra/pre-algebra-arith-prop/pre-algebra-order-of-operations/v/introduction-to-order-of-operations

Properties of Exponents (Questions 5-10)

Multiplication: https://www.khanacademy.org/math/in-seventh-grade-math/exponents-powers/laws-exponents-examples/v/exponent-properties-involving-products

Division: https://www.khanacademy.org/math/in-seventh-grade-math/exponents-powers/laws-exponents-examples/v/exponent-properties-involving-quotients

With Parenthesis: https://www.khanacademy.org/math/in-seventh-grade-math/exponents-powers/laws-exponents-examples/v/products-and-exponents-raised-to-an-exponent-properties

Multiplying Polynomials (Questions 11-15)

https://www.khanacademy.org/math/algebra/introduction-to-polynomial-expressions/multiplying-binomials-2/v/multiplying-simple-binomials

https://www.khanacademy.org/math/algebra/introduction-to-polynomial-expressions/multiplying-binomials-2/v/multiplying-binomials

Factoring Quadratic Polynomials (Questions 16-20)

https://www.khanacademy.org/math/algebra/polynomial-factorization/factoring-quadratics-1/v/factoring-polynomials-1

Radical Expressions (Questions 21-25)

https://www.khanacademy.org/math/algebra/rational-exponents-and-radicals/alg1-simplify-square-roots/v/simplifying-square-root-expressions

https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/miscellaneous-radicals/v/adding-and-simplifying-radicals

https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/miscellaneous-radicals/v/how-to-rationalize-a-denominator

Finding the Slope of a Line (Questions 26-30)

- From a graph:

https://www.khanacademy.org/math/algebra/two-var-linear-equations/slope/v/slope-of-a-line

- From an equation:
https://www.khanacademy.org/math/algebra-home/alg-linear-eq-func/alg-writing-slope-intercept-equations/v/equation-of-a-line-1

- Through two points:
https://www.khanacademy.org/math/algebra/two-var-linear-equations/slope/v/slope-of-a-line-2

Graphing Lines, Inequalities, and Absolute Values (Questions 31-35)

- Lines:
https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-linear-equations-functions/8th-solutions-to-two-var-linear-equations/v/graphs-of-linear-equations

https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-linear-equations-functions/8th-solutions-to-two-var-linear-equations/v/plotting-x-y-relationships

- Inequalities:
https://www.khanacademy.org/math/algebra/two-variable-linear-inequalities/graphing-inequalities/v/graphing-inequalities

- Absolute Values:
https://www.khanacademy.org/math/algebra-home/alg-absolute-value/alg-graphs-of-absolute-value-functions/v/shifting-absolute-value-graphs

Solving Systems of Equations (Questions 36-40)

- Elimination:
https://www.khanacademy.org/math/algebra/systems-of-linear-equations/equivalent-systems-of-equations/v/simple-elimination-practice

- Substitution:
https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-systems-topic/cc-8th-systems-with-substitution/v/the-substitution-method

- System of Inequalities:
https://www.khanacademy.org/math/algebra/two-variable-linear-inequalities/graphing-inequalities/v/graphical-system-of-inequalities

Word Problems (Questions 41-45)

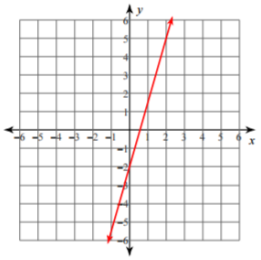
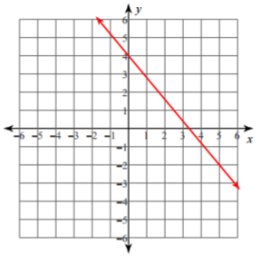
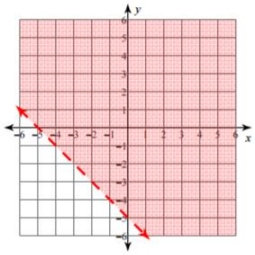
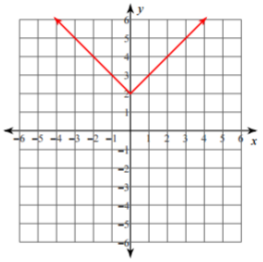
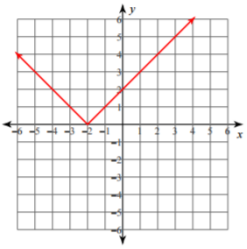
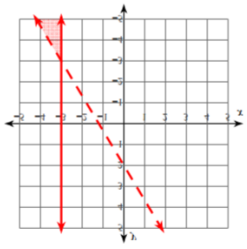
https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/taking-percentages

https://www.khanacademy.org/math/algebra2/rational-expressions-equations-and-functions/modeling-with-rational-functions/v/applying-rational-equations-1

https://www.khanacademy.org/math/pre-algebra/pre-algebra-ratios-rates/pre-algebra-rates/v/multiple-rates-word-problem

Essential Algebra Summer Review Answers

Please Note: The answers are posted so that you may check your work and determine if you understand the concepts. To copy these answers without doing the work is a total waste of your time, and will not help you understand the material. Please do your own work!

1. 1
2. 10
3. 24
4. $\frac{5}{9}$
5. $8k^5$
6. $4v^4u^2$
7. $16a^6$
8. $\frac{x^3}{4y^5}$
9. $\frac{2x^2}{3yz^7}$
10. $8x^8y^6$
11. $12v^2 + 18v$
12. $x^2 - 9$
13. $6x^2 + 16x - 6$
14. $8n^2 + 26n + 6$
15. $4p^2 - 4p + 1$
16. $(a + 2)(a + 9)$
17. $(n - 8)(n + 7)$
18. $(x + 6)(x - 2)$
19. $(2v + 1)(v + 5)$
20. $(5x - 3)(x - 3)$
21. $8xy$
22. $4pq\sqrt{2r}$
23. $20x\sqrt{x}$
24. $3\sqrt{2v} + \sqrt{30v}$
25. $\frac{2\sqrt{3}}{15}$
26. $m = -\frac{5}{4}$
27. $m = \frac{7}{2}$
28. $m = -\frac{6}{5}$
29. $m = 14$
30. $m = 0$
31. 
32. 
33. 
34. 
35. 
36. $(10, -1)$
37. $(9, 5)$
38. $(3, -4)$
39. $(2, 3)$
40. 
41. 32
42. 39.5%
43. 4 and 8
44. 2.73 hours
45. 8 km/h