Incoming Algebra 2 Honors Summer Practice (Note: Solutions are at the end of the packet!)

Directions: Do your work on a **separate** sheet of graph paper. This is not for extra credit, but simply an optional problem set to review some of the basics before entering Algebra 2 Honors.

I. Proportions and Order of Operations

A. Simplify the expression.

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

B. Solve the proportion

5. $\frac{30}{18} = \frac{20}{x}$
6. $-\frac{6}{5} = \frac{x}{2}$
7. $-\frac{10}{5} = \frac{x+11}{x+8}$
8. $\frac{2}{x+8} = \frac{x-6}{-20}$

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

9. $2k^4 \cdot 4k^{-1}$
10. $4v^3 \cdot vu^2$
11. $(-2a^3)^4$
12. $(2x^0y^2)^{-3} \cdot 2yx^3$
13. $\frac{2x^4y^{-4}z^{-3}}{3x^2y^{-3}z^4}$
14. $\left(\frac{4x}{6y^{-2}}\right)^{-3}$

III. Solving Equations

A. Solve each equation for x.

15. $a = \frac{x+y+z}{b}$
16. $ax + by = c$
17. $\frac{|6x-2|}{-8} = -1$
18. $8|8 + 4x| - 3 = 61$

B. Solve each equation by clearing the fractions.

19. $-\frac{61}{42} = -\frac{9}{7}n + \frac{5}{6}$

20. $\frac{36}{7} - \frac{8}{7}x = 2x + \frac{13}{3}$

21. $-\frac{19}{6}\left(x + \frac{1}{5}\right) = \frac{373}{30} + 5x$

22. $\frac{1}{8}k + 4\left(\frac{15}{8}k + \frac{24}{5}\right) = -\frac{31}{20} - \frac{11k}{4}$

IV. Writing Linear Equations: Write the equation of the line with the given information.

23. In slope-intercept form through $(0, 4)$ and $(-7, 2)$

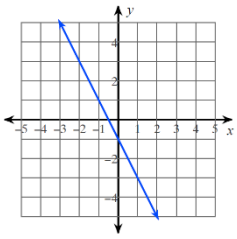
24. Through $(-5, 5)$ and $(-5, 1)$

25. In point-slope form and slope-intercept form through $(-2, -2)$ and $(-3, -5)$.

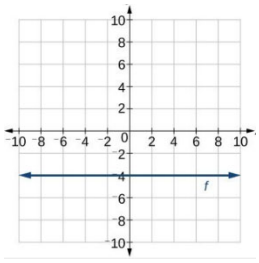
26. In point-slope form for the equation of the line through $(-3, 1)$ and parallel to $4x + 5y = 4$.

27. In point-slope form for the equation of the line through $(-3, 1)$ and perpendicular to $y = \frac{3}{2}x + 4$.

28. Using the graph below.



29. Using line f below.



V. Graphing Practice: Graph on a coordinate plane.

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

31. $6x + 5y = 20$

32. $y > -x - 5$

33. $y = |x| + 2$

34. $y = |x + 2|$

35. $x = -2$

VI. Radical Expressions: Simplify. Give exact answers and rationalize denominators!

36. $\sqrt{108}$

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

38. $-2\sqrt{8p^{10}q^7r}$

39. $\sqrt{30x^2}\cdot\sqrt{30x}$

40. $\frac{\sqrt{4}}{5\sqrt{3}}$

41. $\sqrt{20}+\sqrt{45}-\sqrt{50}$

VII. Multiplying Polynomials: Multiply.

42. $9x(2x-3)$

43. $6v^3u(2v^2-3vu^4)$

44. $(x+3)(x-3)$

45. $(x+3)(6x-2)$

46. $(2p-1)^2$

47. $(4n+1)(2n+6)$

VIII. Factoring: Factor each polynomial completely.

48. $8x^2+22x$

49. $21ab^4c^2-24a^6bc^2$

50. $a^2+11a+18$

51. $x^2+4x-12$

52. $7x^5y-56x^3y+49xy$

53. $2v^2+11v+5$

54. $25x^2-60x+36$

55. $5x^2-18x+9$

56. $6a^2-84a+288$

57. $5x^3+10x^2-6x-12$

58. $4x^2+4x-15$

59. $3b^2-14b-24$

60. $6x^2+7x-20$

61. x^4-16

62. $9a^2-100b^2$

IX. Systems Practice

A. Solve the system by substitution.

63. $-7x-2y=-13$
$x-2y=11$

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

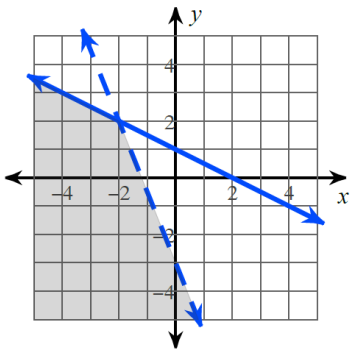
B. Solve the system by elimination.

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

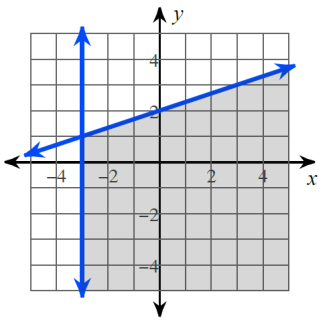
66. $-4x + 9y = 9$
$x - 3y = -6$

C. Write the system of inequalities depicted by the graph below.

67.



68.



X. Quadratic Equations

A. Solve (find the zeros) by factoring.

69. $f(x) = x^2 - 5x - 6$

70. $h(x) = x^2 - 7x$

71. $5x^2 + 20 = 20x$

72. $-7m = -5m^2 + 24$

B. Solve by completing the square.

73. $a^2 - 6a + 18 = 10$

74. $10x + x^2 = 42$

75. $2x^2 - 16x = 16$

C. Solve by using square roots.

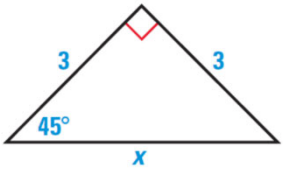
76. $r^2 + 6 = 10$

77. $6m^2 - 4 = 146$

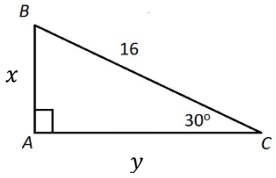
78. $7 + 36n^2 = 16$

XI. **Special Right Triangles**: Find the value of the missing variable(s) in exact terms.

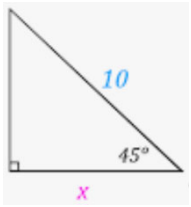
79.



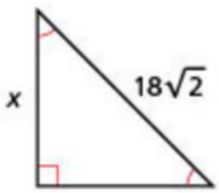
80.



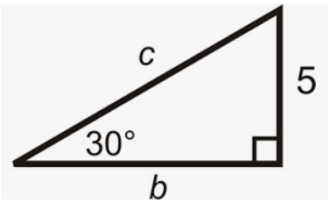
81.



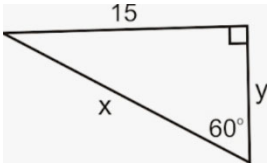
82.



83.



84.



XII. **Simplifying Rational Expressions**: Simplify as much as possible and leave your final answer in factored form. Identify the values for which the expression is undefined.

85. $\frac{r-5}{7r^2-35r}$

86. $\frac{x^3-x^2-36x+36}{x^2-x-30}$

87. $\frac{2n^3-8n^2-64n}{n^2-15n+56}$

XIII. **Miscellaneous:** Solve each problem below. Draw a diagram, if necessary.

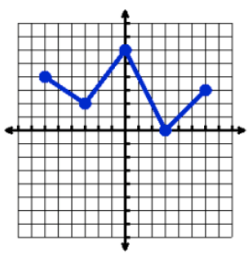
88. A garden that has a diameter of 8 yards has a ring-shaped path around it that has a width of 2 yards. What is the area of the path? Leave your answer in terms of π.

89. If the sum of three consecutive odd integers is 171, what are the three numbers?

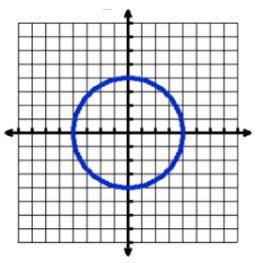
90. Sophia has $500 in her bank account. Every week, she **withdraws** $20 for expenses. Without making any deposits, how many weeks can she withdraw this money if she wants to maintain a balance of at least $250? Write an inequality to represent the situation, and then solve.

91. Identify the domain and range of the graphs below.

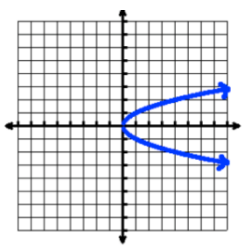
A.



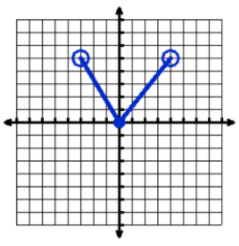
B.



C.



D.



Video Help for Each Topic

I. Proportions and Order of Operations

Proportions: https://youtu.be/GhC60BmRO2Y

https://www.khanacademy.org/math/algebra-basics/alg-basics-linear-equations-and-inequalities/alg-basics-write-and-solve-proportions/v/proportions-2-exercise-examples

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

II. Properties of Exponents

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

III. Solving Equations

Literal: https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/solving-for-a-variable

Absolute Value Equations: https://www.khanacademy.org/math/algebra-home/alg-absolute-value/alg-absolute-value-equations/v/absolute-value-equations

Clearing the Fractions:
https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:solve-equations-inequalities/x2f8bb11595b61c86:linear-equations-variables-both-sides/v/solving-equations-with-the-distributive-property-2

IV. Writing Linear Equations

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

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

V. Graphing Practice

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

VI. Radical Expressions

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

VII. Multiplying Polynomials

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

VIII. Factoring

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

Factoring Polynomial with 4 terms:
https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:factor-quadratics-grouping/v/factor-by-grouping-and-factoring-completely

Leading Coefficient Not 1 (several methods on how to approach it, this is one): https://youtu.be/4v-EQIxqpMQ

https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:factor-quadratics-grouping/v/factoring-trinomials-by-grouping-4

https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:factor-quadratics-grouping/a/factoring-quadratics-leading-coefficient-not-1

IX. Systems Practice

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

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

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

X. Quadratic Equations

https://www.youtube.com/watch?v=SDe-1lGeS0U
https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:quadratics-solve-factoring/v/example-1-solving-a-quadratic-equation-by-factoring

https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:completing-square-quadratics/v/solving-quadratic-equations-by-completing-the-square

https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:untitled-1082/v/simple-quadratic-equation

XI. Special Right Triangles

45-45-90 Triangles: https://www.khanacademy.org/math/geometry-home/right-triangles-topic/special-right-triangles/v/45-45-90-triangles

30-60-90 Triangles: https://www.khanacademy.org/math/geometry-home/right-triangles-topic/special-right-triangles/v/intro-to-30-60-90-triangles

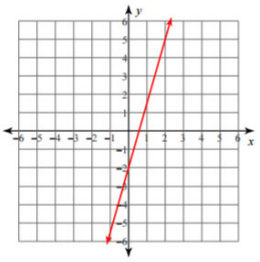
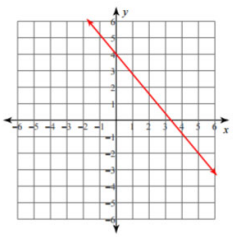
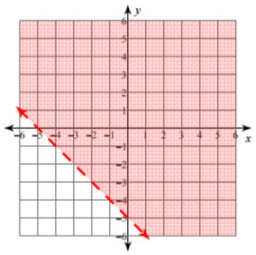
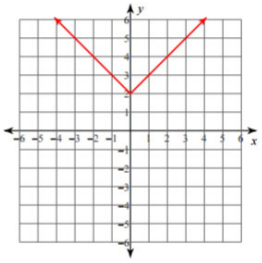
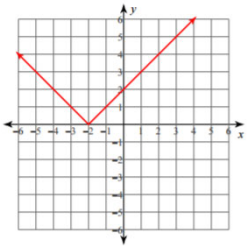
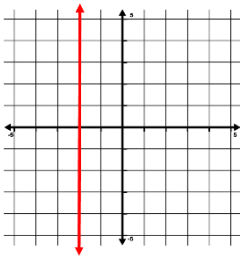
XII. Simplifying Rational Expressions

https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:rational/x2ec2f6f830c9fb89:cancel-common-factor/v/simplifying-rational-expressions-introduction

https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:rational/x2ec2f6f830c9fb89:cancel-common-factor/a/simplifying-rational-expressions-advanced

Incoming Algebra 2 Honors Summer Practice Solutions

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.

1. 1
2. 24
3. 10
4. $\frac{5}{9}$
5. $x = 12$
6. $x = -\frac{12}{5}$
7. $x = -9$
8. $x = -4, 2$
9. $8k^3$
10. $4v^4u^2$
11. $16a^{12}$
12. $\frac{x^3}{4y^5}$
13. $\frac{2x^2}{3yz^7}$
14. $\frac{27}{8x^3y^6}$
15. $x = ab - y - z$
16. $x = \frac{c-by}{a}$
17. $x = -1, \frac{5}{3}$
18. $x = -4, 0$
19. $x = \frac{16}{9}$
20. $x = \frac{17}{66}$
21. $x = -\frac{8}{5}$
22. $k = -2$
23. $y = \frac{2}{7}x + 4$
24. $x = -5$
25. $y + 2 = 3(x + 2)$ or $y + 5 = 3(x + 3)$; $y = 3x + 4$
26. $y - 1 = -\frac{4}{5}(x + 3)$
27. $y - 1 = -\frac{2}{3}(x + 3)$
28. $y = -2x - 1$
29. $y = -4$
30. 
31. 
32. 
33. 
34. 
35. 
36. $6\sqrt{3}$

37. $8xy$

38. $-4p^5q^3\sqrt{2qr}$

39. $30|x|\sqrt{x}$

40. $\frac{2\sqrt{3}}{15}$

41. $5\sqrt{5}-5\sqrt{2}$

42. $18x^2-27x$

43. $12v^5u-18v^4u^5$

44. x^2-9

45. $6x^2+16x-6$

46. $4p^2-4p+1$

47. $8n^2+26n+6$

48. $2x(4x+11)$

49. $3abc^2(7b^3-8a^5)$

50. $(a+9)(a+2)$

51. $(x+6)(x-2)$

52. $7xy(x^2-7)(x+1)(x-1)$

53. $(2v+1)\,(v+5)$

54. $(5x-6)^2$

55. $(5x-3)(x-3)$

56. $6(a-6)(a-8)$

57. $(5x^2-6)(x+2)$

58. $(2x+5)(2x-3)$

59. $(3b+4)(b-6)$

60. $(3x-4)(2x+5)$

61. $(x^2+4)(x+2)(x-2)$

62. $(3a-10b)(3a+10b)$

63. $(3,-4)$

64. $(2,3)$

65. $(10,-1)$

66. $(9,5)$

67. $y\leq-\frac{1}{2}x+1\,;\,y<-\frac{5}{2}x-3$

68. $x\geq-3;\,y\leq\frac{1}{3}x+2$

69. $x=-1,6$

70. $x=0,7$

71. $x=2$

72. $m=-\frac{8}{5}\,,3$

73. $a=2,4$

74. $x=-5\pm\sqrt{67}$

75. $x=4\pm2\sqrt{6}$

76. $r=\pm2$

77. $m=\pm5$

78. $n=\pm\frac{1}{2}$

79. $x=3\sqrt{2}$

80. $x=8;y=8\sqrt{3}$

81. $x=5\sqrt{2}$

82. $x=18$

83. $b=5\sqrt{3};c=10$

84. $x=10\sqrt{3};y=5\sqrt{3}$

85. $\frac{1}{7r};\ r\neq0,5$

86. $\frac{(x\ +\ 6)(x\ -\ 1)}{x\ +\ 5}$;
$x\neq-5,6$

87. $\frac{2n(n\ +\ 4)}{n\ -\ 7}$;
$n\neq7,8$

88. $20\pi\ yd^2$

89. $55,57,59$

90. $500-20x\geq250$; $x\leq12.5$; Therefore, Sophia can withdraw $20 per week for 12 weeks and she will still maintain a balance of at least $250.

91.

Graph A →

Domain: $-6\leq x\leq6$;

Range: $0\leq y\leq6$

Graph B →

Domain: $-4\leq x\leq4$;

Range: $-4\leq y\leq4$

Graph C →

Domain: $x\geq0$;

Range: $y=$ all real #s

Graph D →

Domain: $-3<x<4$;

Range: $0\leq y<5$