



MONMOUTH REGIONAL HIGH SCHOOL

ALGEBRA II

WITH TRIGONOMETRY HONORS

2023 summer Assignment

Welcome to Algebra II Trig Honors! To be successful in this course you will need to be proficient in skills from Algebra 1. As these are prerequisite skills, this information will not be retaught during class. This summer assignment will serve as practice to review and strengthen your algebraic skills. If you do not remember how to complete any of the sections, use the links provided to see worked out examples. **You should be confident in your ability to answer these types of questions by September.**

All work **MUST** be written neatly, accurately, and organized. Writing your work will be beneficial to show understanding of the content. If you use a calculator on a problem, show your work by writing what you entered into the calculator. **Answers are included on the last page, so you can check answers and correct any mistakes.**

These skills will be reviewed on the first day of class, so bring the completed assignment with you and be prepared to ask questions. An assessment on these topics will be given within the first week of school.

Enjoy your summer! We look forward to seeing you in September!

Note: Space is provided to complete this assignment on a paper copy of this document. However, open this assignment from the school's summer assignment webpage for easier access to links.

Simplify Expressions

Examples:

Adding/Subtracting Fractions:

<https://www.coolmath4kids.com/math-help/fractions/adding-and-subtracting-fractions-different-denominators>

Multiplying/Dividing Fractions:

<https://www.coolmath4kids.com/math-help/fractions/multiplication-fractions-and-whole-numbers>

<https://www.coolmath4kids.com/math-help/fractions/dividing-fractions>

DIRECTIONS: Evaluate each expression for $a = -3$, $b = 2$, $c = 6$, and $d = 0$.

1. $b - a$	2. $(b - a) \div (b + a)$	3. $d \div c$
4. $c \div d$	5. $\frac{b}{a} \div \frac{a}{c}$	6. $(a + b - c)^2$
7. $a - bc$	8. $\frac{b}{a} + \frac{a}{c}$	9. Simplify $\frac{4x-2}{4}$

Solving Equations

DIRECTIONS: Solve each equation.

10. $\frac{n}{-5} = 8$	11. $\frac{4n}{5} = 8$	12. $5[2 - (2m - 4)] = 10 - 6m$
13. $-\frac{4}{3}x = -\frac{1}{(-3)}$	14. $\frac{1}{2}(2x + 4) = -10$	15. $x - 4x + 7x - 6 = 10x - 12$

Properties of Exponents & Radicals

Examples:

All basic properties - <https://www.youtube.com/watch?v=LkhPRz7Hocg>

Fractional Exponents - <https://www.youtube.com/watch?v=GipavLCnke0>

Radicals - <https://www.coolmath.com/prealgebra/14-intro-to-radicals/03-radicals-rewriting-simplifying-04-76>

Adding/Subtracting Radicals - <https://www.coolmath.com/prealgebra/14-intro-to-radicals/04-radicals-adding-subtracting-01-78-79>

#16-21 Evaluate each expression WITHOUT A CALCULATOR. The goal is to be able to simplify each using properties of exponents rather than just plugging everything into the calculator.

16. $(2^{-2})^3$

17. $4^{-2} + 4^{-2}$

18. $\frac{5^8}{5^6}$

19. $8^{-\frac{2}{3}}$

20. $\sqrt[3]{27^2}$

21. $-\left(\frac{1}{64}\right)^{-\frac{1}{3}}$

#22-33 Simplify each expression. Use only positive exponents in the final answer. Show all steps.

22. $(-y^2)(3y^2z)(-5yz^4)$

23. $(-3x^2)(-2x^4)(5x)$

24. $\frac{-40a^{-8}b^{20}}{25a^6b^{10}}$

25. $\frac{14a^{-8}b^2}{21a^{-15}b^{10}}$

26. -4^0

27. $(-4x^5y^7)^3$

28. $9x^8(4z^9)^3$	29. $\left(\frac{3}{x}\right)^3\left(\frac{2}{x}\right)^2$	30. $(-2x^3)^{-3}(-3x^{-2})^4$
31. $\left(\frac{u^{-4}}{m^{-6}}\right)\left(\frac{u}{m}\right)^8$	32. $\sqrt[4]{32q^{11}n^{-8}}$	33. $\sqrt{50n^{15}} - 6\sqrt{2n^{15}}$

Factoring Polynomials

FORMULAS TO HAVE MEMORIZED:

Difference of Squares:

$$\begin{aligned} &a^2 - b^2 \\ &= (a + b)(a - b) \end{aligned}$$

Difference of Cubes:

$$\begin{aligned} &a^3 - b^3 \\ &= (a - b)(a^2 + ab + b^2) \end{aligned}$$

Sum of Cubes:

$$\begin{aligned} &a^3 + b^3 \\ &= (a + b)(a^2 - ab + b^2) \end{aligned}$$

Examples:

Factoring Trinomials - <https://www.youtube.com/watch?v=NFZRoDDy2n8>

Factoring GCF - <https://www.youtube.com/watch?v=3RJIPvX-3vg>

DIRECTIONS: Factor each expression COMPLETELY.

34. $8x^2y + 10xy$

35. $18p^3 - 63p^2 - 9p$

36. $x^2 - 11x + 24$

37. $x^2 - 3x - 18$	38. $12y^2 - 7y + 1$	39. $x^3 - 2x^2 - x + 2$
40. $4x^2 + 3x - 7$	41. $21x^7 + 35x^4 + 27x^3 + 45$	42. $c^2 - 100$
43. $8x^2 - 162$	44. $3x^3 + 81$	45. $27x^3 - 64$

Solving Quadratic Equations by FACTORING:

Examples:

<http://www.coolmath.com/algebra/09-solving-quadratics/02-solving-quadratic-equations-by-factoring-02>

DIRECTIONS: Solve each of the following equations by FACTORING.

46. $x^2 + 8x + 15 = 0$	47. $3x^2 - 16x - 7 = 5$	48. $6x^2 - 13x + 3 = -3$
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Solving Quadratic Equations Using the QUADRATIC FORMULA:

Examples: <https://www.youtube.com/watch?v=JSwjmTFMDwg>

**You need to have this formula memorized. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

DIRECTIONS: Solve each equation using the QUADRATIC FORMULA. Leave answers in simplified radical form.

49. $4x^2 + 11x - 20 = 0$

50. $x^2 - 3x = 3$

51. $4x^2 - 1 = -8x$

Operations on Polynomial Expressions

Examples:

Adding Polynomials- <http://www.virtualnerd.com/algebra-1/polynomials-and-factoring/add-subtract/add/addition-example>

Subtracting Polynomials- <http://www.virtualnerd.com/algebra-1/polynomials-and-factoring/add-subtract/subtract/subtraction-example>

Multiplying Polynomials- <https://www.youtube.com/watch?v=OdxknmZgKyw>

DIRECTIONS: Perform all operations and write the final answers in standard form (descending order). Show all work. Any "calculator" work must be written out.

52. $(3x^2 - 5x) - (x^2 + 4x + 3)$

53. $5(x^2 - x + 2)$

54. $(2x^3 - 4x^2 + 3) + (x^3 - 3x^2 + 1)$

55. $4(x^2 - 3) + x(x - 1)$

56. $(2x + 1)(3x - 5)$	57. $(x + 3)(x^2 + 4x - 2)$
58. $(y - 3)^2$	59. $(-7x^2 - 3)^2$

Solving Inequalities

DIRECTIONS: Solve and graph on a number line.

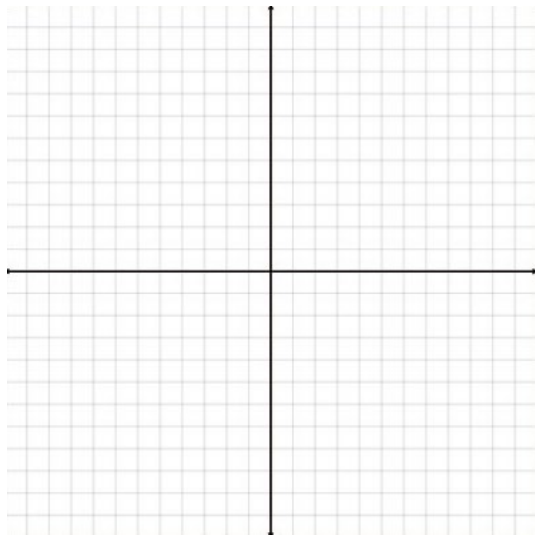
60. $6 - 2x > 20$	61. $8 - x \leq 0$ or $-2x + 3 \leq -6$
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Graphing Lines

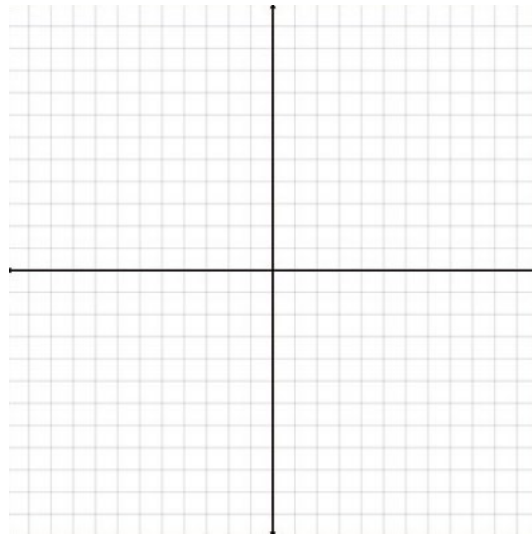
Examples: <https://www.youtube.com/watch?v=WQyvskZSCJg>

DIRECTIONS: Graph the following linear equations ON THE COORDINATE PLANE PROVIDED
Please use a ruler or a straight edge to graph.

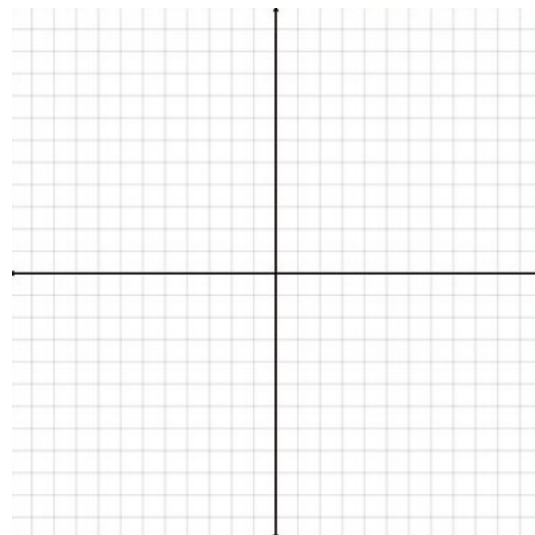
62. $y = -4x + 1$



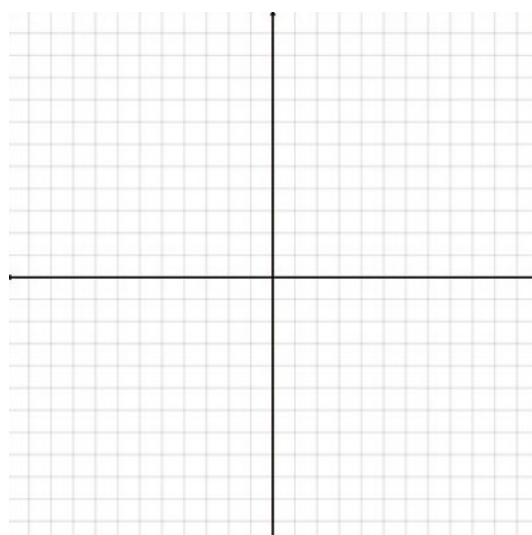
63. $2x + 4y = 8$



64. $x = -3$



65. $y = 6$

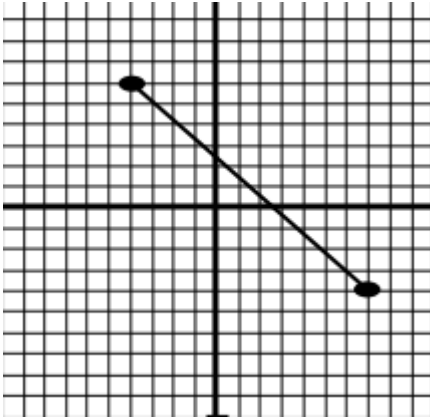


Domain & Range

Examples: <https://www.youtube.com/watch?v=KirGQOwjBVI>

DIRECTIONS: Write the domain and range of each relation. AND Is it a function?

66.

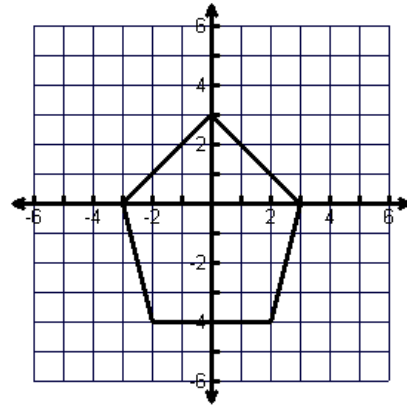


Is the graph a function? _____

Domain: _____

Range: _____

67.

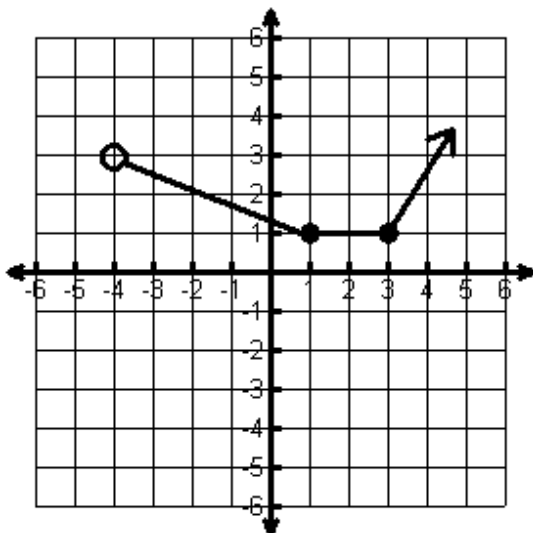


Is the graph a function? _____

Domain: _____

Range: _____

68.

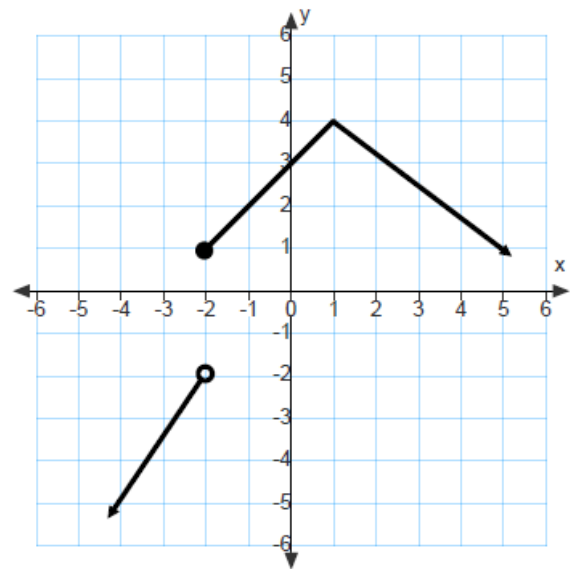


Is the graph a function? _____

Domain: _____

Range: _____

69.

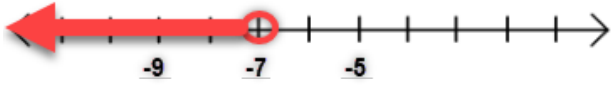
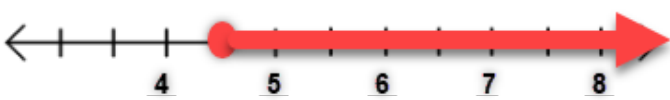


Is the graph a function? _____

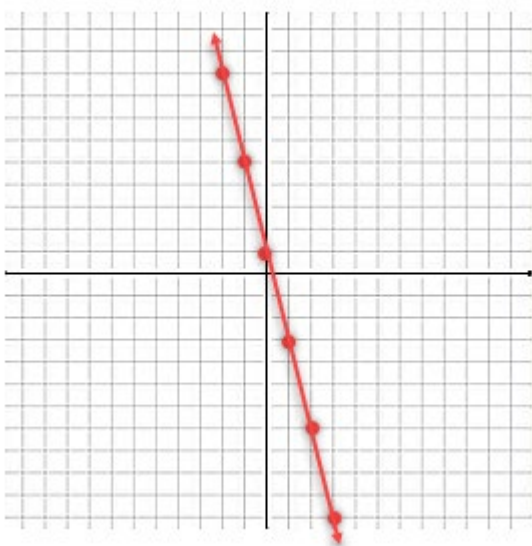
Domain: _____

Range: _____

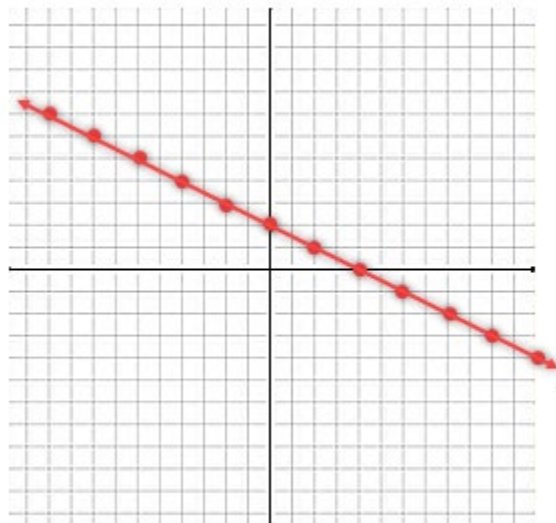
ANSWER KEY

1. 5	2. -5	3. 0	4. Undefined
5. $\frac{4}{3} = 1\frac{1}{3}$	6. 49	7. -15	8. $-\frac{7}{6} = -1\frac{1}{6}$
9. $\frac{2x-1}{2} = x - \frac{1}{2}$	10. $n = -40$	11. $n = 10$	12. $m = 5$
13. $x = -\frac{1}{4}$	14. $x = -12$	15. $x = 1$	16. $\frac{1}{64}$
17. $\frac{1}{8}$	18. 25	19. $\frac{1}{4}$	20. 9
21. -256	22. $15y^5z^5$	23. $30x^7$	24. $-\frac{8b^{10}}{5a^{14}}$
25. $\frac{2a^7}{3b^8}$	26. -1	27. $-4^3x^{15}y^{21}$	28. $576x^8z^{27}$
29. $\frac{108}{x^5}$	30. $-\frac{81}{8x^{17}}$	31. $\frac{u^4}{m^2}$	32. $\frac{2q^2}{n^2} \sqrt[4]{2q^3}$ OR $\frac{2q^2}{n^2} \sqrt[4]{2q^3}$
33. $-n^7 \sqrt{2n}$	34. $2xy(4x+5)$	35. $9p(2p^2 - 7p - 1)$	36. $(x - 8)(x - 3)$
37. $(x - 6)(x + 3)$	38. $(4y - 1)(3y - 1)$	39. $(x+1)(x-1)(x-2)$	40. $(4x + 7)(x - 1)$
41. $(7x^4 + 9)(3x^3 + 5)$	42. $(c - 10)(c + 10)$	43. $2(2x - 9)(2x + 9)$	44. $3(x + 3)(x^2 - 3x + 9)$
45. $(3x - 4)(9x^2 + 12x + 16)$	46. $x = -5, -3$	47. $x = -\frac{2}{3}, 6$	48. $x = \frac{2}{3}, \frac{3}{2}$
49. $x = \frac{5}{4}, -4$	50. $x = \frac{3 \pm \sqrt{21}}{2}$	51. $x = -\frac{2 \pm \sqrt{5}}{2}$	52. $2x^2 - 9x - 3$
53. $5x^2 - 5x + 10$	54. $3x^3 - 7x^2 + 4$	55. $5x^2 - x - 12$	56. $6x^2 - 7x - 5$
57. $x^3 + 7x^2 + 10x - 6$	58. $y^2 - 6y + 9$	59. $49x^4 + 42x^2 + 9$	
60. $x < -7$ 		61. $8 \leq x$ or $x \geq 4.5$ 	

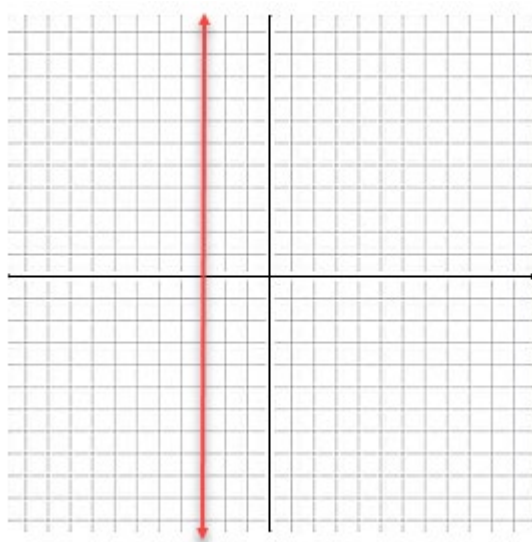
62. $y = -4x + 1$



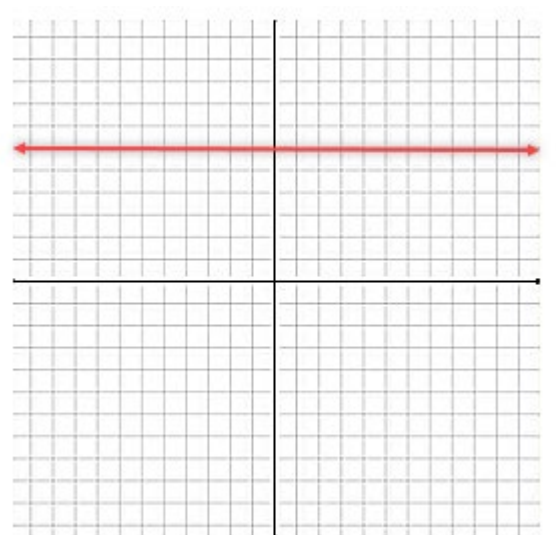
63. $2x + 4y = 8$



64. $x = -3$



65. $y = 6$



66.

Is a Function

D: $[-4, 7]$ or $-4 \leq x \leq 7$

R: $[-4, 6]$ or $-4 \leq y \leq 6$

67.

NOT a Function

D: $[-3, 3]$ or $-3 \leq x \leq 3$

R: $[-4, 3]$ or $-4 \leq y \leq 3$

68.

Is a Function

D: $(-4, \infty)$ or $x > -4$

R: $[1, \infty)$ or $y \geq 1$

69.

Is a Function

D: $(-\infty, \infty)$ or all Real Numbers (\mathbb{R})

R: $(-\infty, 4]$ or $y \leq 4$