Honors Geometry Summer Enrichment

Use the links provided to help you re-learn any skills that you have forgotten.

Watch this Video for tutorials on Solving Equations, factoring basics, graphing, solving systems of equations, and much more that you will learn this year!
https://www.youtube.com/watch?v=lc06HaV9Zjw

Solving Equations:

1. $x + 12 = 25$
2. $a - 6 = 0$
3. $-42 = -7c$
4. $\frac{1}{5} n = 10$
5. $-32y = 4$
6. $-\frac{3}{4} x = 24$
7. $w - 5 = -13$
8. $4.6 + y = 2.6$
9. $4a = 132$
10. $-6 = c + 4$
11. $-\frac{4}{7} x = -8$
12. $\frac{2}{3} y = 7$
13. $\frac{1}{2} x = -40$
14. $330 = -15c$
15. $y + 7 = -13$
16. $\frac{9}{2} x = -1$
17. $a - \frac{1}{8} = \frac{5}{8}$
18. $\frac{n}{3} = 6$
19. $3y - 4 = 20$
20. $\frac{c}{7} + 2 = 1$
21. $6 - \frac{3a}{2} = -6$
22. $3r - (2r + 1) = 21$
23. $5(x + 3) = 12$
24. $44 = 5y - 8 - y$
25. $75 + 7c = 2c$
26. $11r + 120 = -r$
27. $\frac{3}{5} n + 12 = 2n - 9$
28. $4 - 6p = 2p - 3$
29. $7(a - 3) = 8a + 2$
30. $x - (-4x + 2) = 13$
31. $-\frac{1}{2} (16 - 2y) = 11$
32. $\frac{1}{4} w + 27 = 41$

33. 7(4c + 1) – 2(2c – 3) = -23

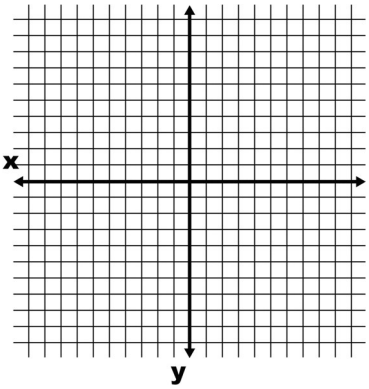
34. 104 + x = ½ (360 – 2x)

Linear Tables and Their Graphs:

Use a table of values to graph the line. Record at least four points

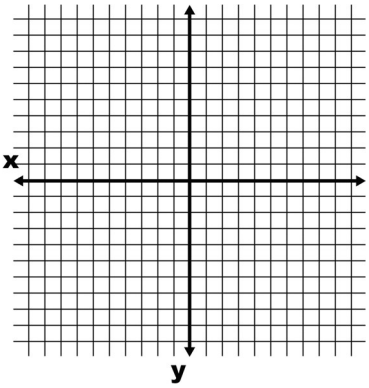
35. 2x + y = 3

x	y



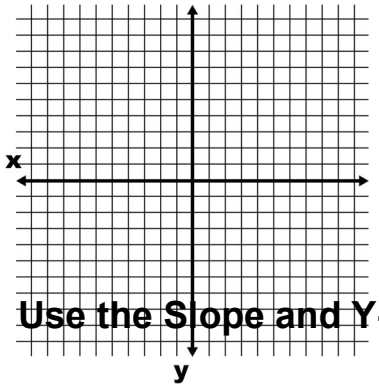
36. x – 3y = 6

x	y



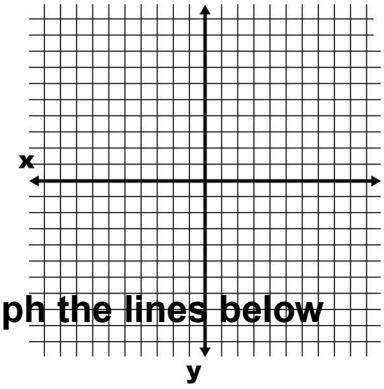
37. x + 5y = -10

x	y



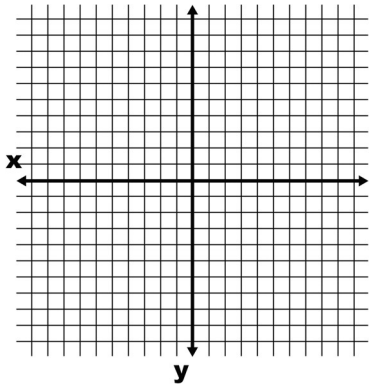
38. -1/3 x + y = -2

x	y

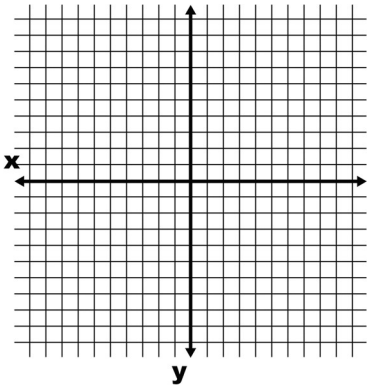


Use the Slope and Y-Intercept to graph the lines below

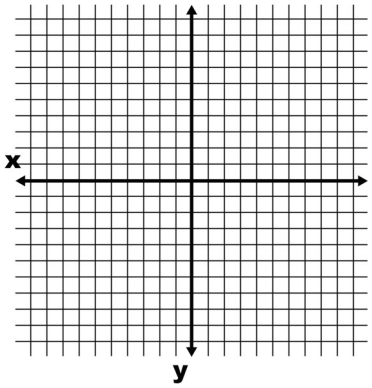
39. y = 2x – 4



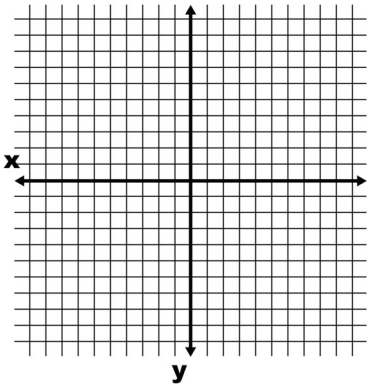
40. y= -3x + 5



41. y = ¼ x – 7



42. -2/3 x + y = 0



Writing Linear Equations:

(Help link: https://www.youtube.com/watch?v=-6Fu2T_RSGM)

Write an equation in slope-intercept form of the line that passes through the given point and has the given slope.

43. (0, -4), m = 1

44. (0,8), m = -3

45. (1, -5), m = 2

46. (3,-11), m = 0

47. (3,0), m = -4

48. (-6,-6) m = 12

Write an equation in slope-intercept form of the line that passes through the given 2 points.

49. (1,2), (3,-2)

50. (0,-3), (-5,0)

51. (-6,-7), (-5,1)

52. (4,2), (7,-4)

53. (11, -1), (-1, -7)

54. (-5,4), (2, -3)

55. (4, -9), (8, -9)

56. (-12, -13), (3, -3)

57. (0, -3), (0, 5)

Solving Systems of Equations:

Solve by graphing: https://www.youtube.com/watch?v=Pd4hwS8qHms

Solve by substitution and Elimination: https://www.youtube.com/watch?v=oKqtgz2eo-Y

A. Solve by Substitution

58. $\begin{aligned} 2x-3y &= -16 \\ y &= 5x+1 \end{aligned}$

59. $\begin{aligned} 3x+5y &= -8 \\ 4x-y &= -3 \end{aligned}$

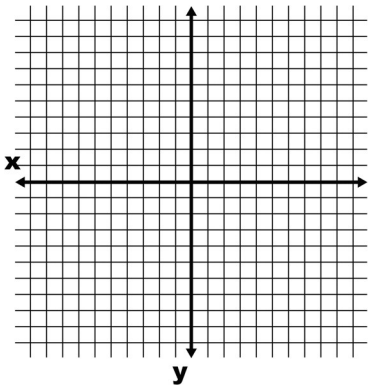
60. $\begin{aligned} x+4y &= 30 \\ 6x+2y &= 4 \end{aligned}$

61. $\begin{aligned} 9x+4y &= 3 \\ x+8y &= 6 \end{aligned}$

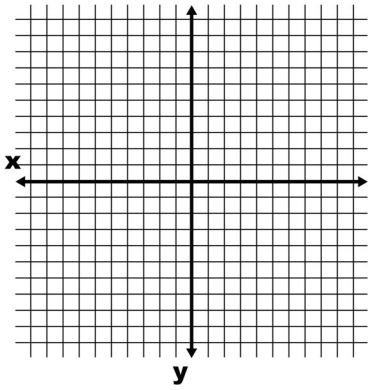
B. Solve the following by **Elimination (Linear Combination**).

Then **graph** both lines by first putting in Slope-Intercept form to check if their intersection matches the answer you got.

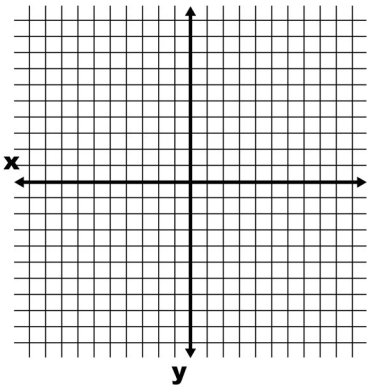
62. $\begin{aligned} 8x - 2y &= 26 \\ 5x + 2y &= 26 \end{aligned}$



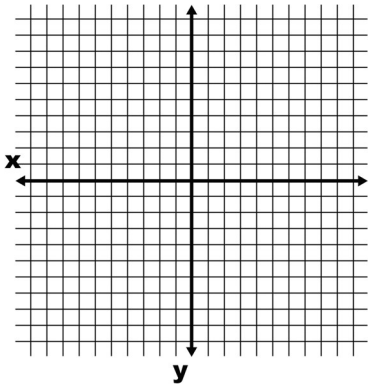
63. $\begin{aligned} 5x + y &= 22 \\ 4x - 3y &= -9 \end{aligned}$



64. $\begin{aligned} 2x + 3y &= 35 \\ 3x + 4y &= 50 \end{aligned}$



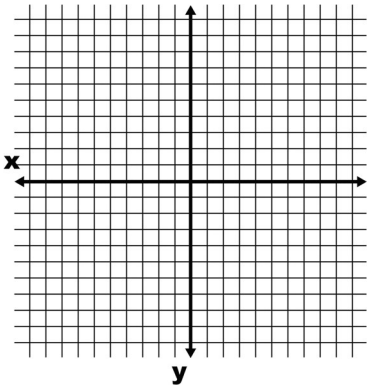
65. $\begin{aligned} 6x - 2y &= -30 \\ 5x + 4y &= -8 \end{aligned}$



66. Choose any method to solve the following system:

3x+7y=4

y = -1/3 x



Simplifying Radicals:

Helpful Link: https://www.youtube.com/watch?v=6QJtWfliyZo
Adding/Subtracting Radicals: https://www.youtube.com/watch?v=VWIFMfPVmkU

67. $\sqrt{16}$ 68. $\sqrt{49}$ 69. $\sqrt{100}$ 70. $\sqrt{12}$

71. $\sqrt{40}$ 72. $\sqrt{27}$ 73. $\sqrt{80}$ 74. $\sqrt{72}$

75. $(3\sqrt{5})^2$ 76. $5\sqrt{45}$ 77. $2\sqrt{8}$ 78. $6\sqrt{90}$

79. $(3\sqrt{3})(2\sqrt{6})$ 80. $(4\sqrt{6})(2\sqrt{10})$ 81. $(4\sqrt{3})^2$ 82. $\sqrt{12} + \sqrt{48}$

83. $5\sqrt{20} - 3\sqrt{45} + \sqrt{12}$ 84. $4\sqrt{200} + 10\sqrt{128} - 8\sqrt{98}$

Solving Quadratic Equations:

Using Square Roots: https://www.youtube.com/watch?v=OO4j6ESyOiY
Quadratic Formula: https://www.youtube.com/watch?v=3ayhvAI3IeY
Factoring: https://www.youtube.com/watch?v=qeByhTF8WEw

A. Solve using square roots. Simplify your radicals if possible.

85. $4x^2 = 80$ 86. $3x^2 - 8 = 4$ 87. $x^2 - 6 = 12$

88. $\frac{1}{2} x^2 + 3 = 245$ 89. $(x + 1)^2 = 27 + x^2$

B. Solve by using Quadratic Formula:

90. $x^2 + 4x - 32 = 0$ 91. $12x + 5x - 2 = 0$

C. Solve by Factoring:

92. $x^2 - 8x - 20 = 0$ 93. $X^2 - x - 6 = 0$ 94. $4x^2 - 1 = 0$

95. $4x^2 + 14x - 8 = 0$ 96. $2x^2 - 18 = 0$ 97. $X^2 + 15x + 54 = 0$

Factor each expression (do not solve for x):

98. $x^2 + 8x + 16$ 99. $12x^2 + 14x - 6$ 100. $15x^2 - 5x - 10$

101. $49x^2 - 64$ 102. $3x^2 - 3x - 90$ 103. $3x^2 + 2x - 8$

Simplifying Exponential Expressions:

Helpful Links: https://www.youtube.com/watch?v=Zt2fdy3zrZU
https://www.youtube.com/watch?v=CZ5ne_mX5_I

EXPONENT RULES & PRACTICE

1. **PRODUCT RULE:** To multiply when two bases are the same, write the base and ADD the exponents.

$$x^m \cdot x^n = x^{m+n}$$

Examples:

A. $x^3 \cdot x^8 = x^{11}$ B. $2^4 \cdot 2^2 = 2^6$ C. $(x^2y)(x^3y^4) = x^5y^5$

2. **QUOTIENT RULE:** To divide when two bases are the same, write the base and SUBTRACT the exponents.

$$\frac{x^m}{x^n} = x^{m-n}$$

Examples:

A. $\frac{x^5}{x^2} = x^3$ B. $\frac{3^5}{3^3} = 3^2$ C. $\frac{x^2y^5}{xy^3} = xy^2$

3. **ZERO EXPONENT RULE:** Any base (except 0) raised to the zero power is equal to one.

$$x^0 = 1$$

Examples:

A. $y^0 = 1$ B. $6^0 = 1$ C. $(7a^3b^{-1})^0 = 1$

4. **POWER RULE:** To raise a power to another power, write the base and MULTIPLY the exponents.

$$(x^m)^n = x^{m \cdot n}$$

Examples:

A. $(x^3)^2 = x^6$ B. $(3^2)^4 = 3^8$ C. $(z^5)^2 = z^{10}$

5. EXPANDED POWER RULE:

$$(xy)^m = x^m y^n \qquad \left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}$$

Examples:

A. $(2a)^3 = 2^3 a^3 = 8a^3$

B. $(6x^3)^2 = 6^2(x^3)^2 = 36x^6$

C. $\left(\frac{x^2}{y}\right)^4 = \frac{(x^2)^4}{y^4} = \frac{x^8}{y^4}$

D. $\left(\frac{2x}{3y^2}\right)^3 = \frac{(2x)^3}{(3y^2)^3} = \frac{2^3x^3}{3^3(y^2)^3} = \frac{8x^3}{27y^6}$

6. NEGATIVE EXPONENTS: If a factor in the numerator or denominator is moved across the fraction bar, the sign of the exponent is changed.

$$x^{-m} = \frac{1}{x^m} \qquad \frac{1}{x^{-m}} = x^m \qquad \left(\frac{x}{y}\right)^{-n} = \left(\frac{y}{x}\right)^n$$

Examples:

A. $x^{-3} = \frac{1}{x^3}$

B. $4^{-2} = \frac{1}{4^2} = \frac{1}{16}$

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

D. $\left(\frac{x^2}{y}\right)^{-3} = \left(\frac{y}{x^2}\right)^3 = \frac{y^3}{x^6}$

E. $(3x^{-2}y)(-2xy^{-3}) = -6x^{-1}y^{-2} = \frac{-6}{xy^2}$

F. $\frac{a^{-2}b^3}{c^{-4}d^{-1}} = \frac{b^3c^4d}{a^2}$

G. $(-2x^2y^{-4})^{-2} = \left(\frac{-2x^2}{y^4}\right)^{-2} = \left(\frac{y^4}{-2x^2}\right)^2 = \frac{y^8}{4x^4}$

CAUTION: $-x \neq \frac{1}{x}$ For example: $-3 \neq \frac{1}{3}$

REMEMBER: An exponent applies to only the factor it is directly next to *unless* parentheses enclose other factors.

Examples:

A. $(-3)^2 = (-3)(-3) = 9$

B. $-3^2 = -9$

EXPONENTS PRACTICE

Simplify:

1. $3 \cdot 4^3$
2. $4x^3 \cdot 2x^3$
3. $x^5 \cdot x^3$
4. $2x^3 \cdot 2x^2$
5. $\frac{6^5}{6^3}$
6. $\frac{x^4}{x^7}$
7. 8^0
8. $-(9x)^0$
9. $(y^4)^3$
10. $(x^2y)^4$
11. $\frac{6x^7}{2x^4}$
12. $\frac{8x^5}{4x^2}$
13. $(2cd^4)^2(cd)^5$
14. $(2fg^4)^4(fg)^6$
15. $\frac{x^5y^6}{xy^2}$
16. $\frac{x^2y^5}{xy^4}$
17. $\left(\frac{4x^5y}{16xy^4}\right)^3$
18. $\left(\frac{5x^3y}{20xy^5}\right)^4$
19. y^{-7}
20. 7^{-2}
21. $\frac{1}{x^{-5}}$
22. $\frac{1}{2^{-4}}$
23. $x^5 \cdot x^{-1}$
24. x^{-6}
25. $x^9 \cdot x^{-7}$
26. $(j^{-13})(j^4)(j^6)$
27. $\frac{x^{-1}}{x^{-8}}$
28. $\frac{52x^6}{13x^{-7}}$
29. $f^{-3}(f^2)(f^{-3})$
30. $\frac{x^{-4}}{x^{-9}}$
31. $\frac{24x^6}{12x^{-8}}$
32. $\frac{3x^2y^{-3}}{12x^6y^3}$
33. $(2x^3y^{-3})^{-2}$
34. $\frac{2x^4y^{-4}}{8x^7y^3}$
35. $(4x^4y^{-4})^3$
36. $5x^2y(2x^4y^{-3})$
37. $\left(\frac{-7a^2b^3c^0}{3a^3b^4c^3}\right)^{-4}$
38. $\left(\frac{-2a^3b^2c^0}{3a^2b^3c^7}\right)^{-2}$