



# Algebra 2 Honors

Dear Students and Parents/Guardians,

Welcome to Algebra 2 Honors! We are excited to support your continued growth in mathematics and prepare you for a successful academic year. In order to ensure students are equipped with the foundational skills necessary for success in this rigorous course, we have prepared a summer assignment focused on reinforcing key concepts from Algebra 1.

This packet is designed to help students retain and strengthen essential Algebra 1 skills. Please note that Algebra 1 concepts are not retaught in Algebra 2 Honors. Instead, this course builds upon them quickly and extensively. Algebra 2 Honors moves at a faster pace, covers more material, and demands a deeper level of critical thinking and problem-solving. Completing this summer work thoroughly and thoughtfully is critical in preparing for the challenges ahead.

- **Due Date:** The completed summer packet is to be submitted on the first day of school. All work must be shown.
- **Assessment:** During the first week of school, students will take an assessment covering the material included in the summer assignment. This will help us evaluate their readiness for Algebra 2 Honors.

## Academic Integrity – Honor Code

By signing below, both the student and parent/guardian affirm that:

- The summer assignment was completed independently, without the use of artificial intelligence tools or outside assistance other than tutorial videos/websites.
- A calculator was not used for problems marked as “non-calculator permitted.”
- The work submitted reflects the student's own understanding and effort.

**I, the student, affirm that I have completed this summer assignment honestly and independently. I did not use AI tools or a calculator for problems that prohibit its use.**

Student Name (Print): \_\_\_\_\_

Student Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**I, the parent/guardian, acknowledge that my child has completed this assignment independently and I understand the expectations for Algebra 2 Honors.**

Parent/Guardian Name (Print): \_\_\_\_\_

Parent/Guardian Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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We look forward to an exciting and productive year ahead!

Sincerely,

The CCS Mathematics Department

## Solving Equations

Solve each equation for the given variable. Check your solutions. #1-21 No Calculator

1.  $8 = 8p + 13 - 3p$

2.  $4y - 16 + 8y = -4$

3.  $-14 = -4(9x - 1)$

4.  $-(5z + 12) = 18$

5.  $\frac{m}{3} + \frac{1}{3} = \frac{2}{3}$

6.  $5r - \frac{1}{5} = \frac{4}{5}$

7.  $\frac{w}{9} - 6 = \frac{7}{9}$

8.  $11 + \frac{4x}{-5} = \frac{2}{3}$

9.  $\frac{5}{7}(k + 5) = -7$

10.  $25h + 40 = -15h - 80$

11.  $-0.2m + 13 = 0.2m - 6$

12.  $5x + 7 + 3x = -8 + 3x$

13.  $18 - 6a = 4a - 4(a + 3)$

14.  $6(4z + 2) = 3(8z + 4)$

15.  $-8t - 3t + 2 = -5t - 6t$

16.  $-6(-p + 8) = -6p + 12$

17.  $-8x - (3x + 6) = 4 - x$

18.  $-2(2f - 4) = -4(-f + 2)$

19.  $3w - 6 + 2w = -2 + w$

20.  $\frac{3}{8}f + \frac{1}{2} = 6\left(\frac{1}{16}f - 3\right)$

21.  $14 + 3n = 8n - 3(n - 4)$

**Literal Equations - Solve each equation for  $m$ .**

22.  $4n - 6m = -2$

23.  $-5n = 13 - 3m$

24.  $10m + 6n = 12$

**Solve each equation for  $x$ .**

25.  $fx - gx = h$

26.  $qx + x = r$

27.  $m = \frac{x+n}{p}$

28.  $d = f + fx$

29.  $-3(x + n) = x$

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

**Solve each equation for the given variable.**

31.  $4k + mn = n - 3$ ; solve for  $n$

32.  $\frac{c}{d} + 2 = \frac{f}{g}$ ; solve for  $c$

33.  $3ab - 2bc = 12$ ; solve for  $c$

34.  $z = \left(\frac{x+y}{3}\right)w$ ; solve for  $y$

35.  $-3(m - 2n) = 5m$ ; solve for  $m$

36.  $A = \frac{1}{2}bcd + bc$ ; solve for  $d$

37. A room with width  $w$ , length  $l$ , and height  $h$  with four walls needs to be painted.
- Write a formula for the area that needs to be painted not accounting for doors or windows.
  - Rewrite the formula to find  $h$  in terms of  $A$ ,  $l$ , and  $w$ .
  - If  $l$  is 18 ft,  $w$  is 14 ft and  $A$  is  $512 \text{ ft}^2$ , what is the height of the room?
  - Reasoning: Suppose  $l$  is equal to  $w$ . Write a formula for  $A$  in terms of  $w$  and  $h$ .

**Solve the formula for the indicated variable.**

Perimeter of a Parallelogram

38. Solve for  $b$ :  $P = 2b + 2s$

Area of a Rhombus

39. Solve for  $d_1$ :  $A = \frac{1}{2}d_1d_2$

Volume of a Right Circular Cone

40. Solve for  $h$ :  $V = \frac{\pi r^2 h}{3}$

Area of a Trapezoid

41. Solve for  $b_1$ :  $A = \frac{1}{2}(b_1 + b_2)h$

**Solve the formula for the indicated variable. The use the given information to find the value of the variable. Include units of measure in the answer.**

**Area of a Parallelogram**

42. Solve for  $h$ :  $A = bh$

**Celsius to Fahrenheit**

43. Solve for  $C$ :  $F = \frac{9}{5}C + 32$

Find  $h$  when  $A = 81 \text{ cm}^2$  and  $b = 9 \text{ cm}$ .

Find  $C$  when  $F = 77^\circ\text{F}$ .

## Linear Inequalities

Solve each inequality and graph the solution on a number line. #44-64 No Calculator

44.  $33y - 3 \leq 8$

45.  $12 > 60 - 6r$

46.  $-5 \leq 11 + 4j$

47.  $2(k + 4) - 3k \leq 14$

48.  $3(4c - 5) - 2c > 0$

49.  $15(j - 3) + 3j < 45$

50.  $20(d - 4) + 4d \leq 8$

51.  $-x + 2 < 3x - 6$

52.  $3v - 12 > 5v + 10$

53.  $6w + 5 > 2(3w + 3)$

54.  $-5r + 15 \geq -5(r - 2)$

55.  $-2(6 + s) < -16 + 2s$

**Compound Inequalities - Solve each inequality and graph the solution on a number line.**

56.  $5 < k - 2 < 11$

57.  $3d + 3 \leq -1$  or  $5d + 2 \geq 12$

58.  $3 < 2p - 3 \leq 12$

59.  $3a - 25 \leq -25$  or  $2a + 3 > 13$

60.  $-3 \leq \frac{11+x}{4} < 3$

61.  $6b - 1 \leq 41$  or  $2b + 1 \geq 11$

62.  $5 - m < 4$  or  $7m > 35$

63.  $-3 \leq \frac{2}{3}x - 1 \leq 1$

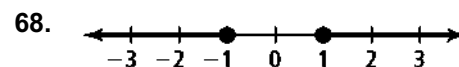
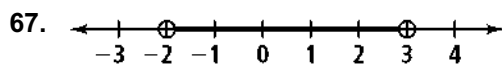
64.  $5z + 3 < -7$  or  $-2z - 6 > -8$

**What compound inequality represents each phrase? Graph the solutions.**

65. All real numbers greater than  $-2$  and less than or equal to  $3$

66. All real numbers less than or equal to  $-1$  or greater than  $1$ .

**Write a compound inequality that each graph could represent.**

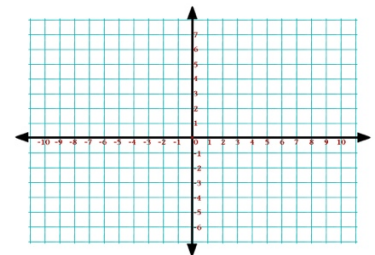
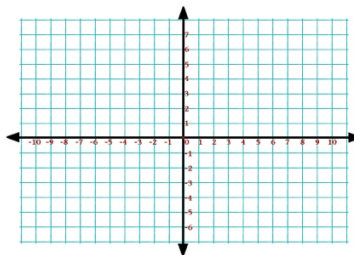
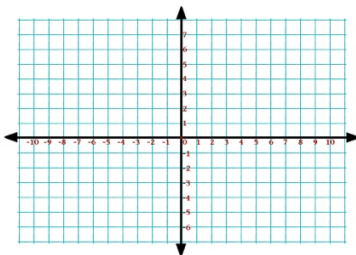


**Graph the inequality on the coordinate plane.**

69.  $2x \leq 8$

70.  $y < 2x - 1$

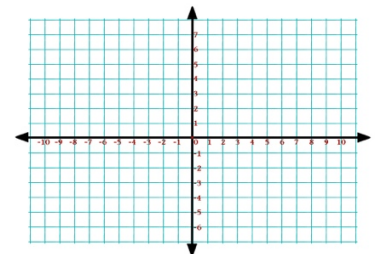
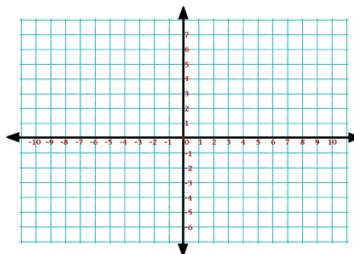
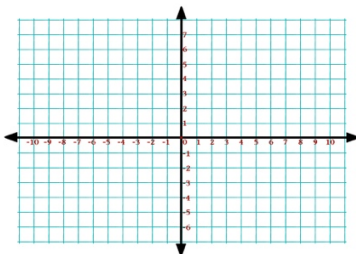
71.  $-\frac{1}{4}y \leq -1$



72.  $x + 3y < 6$

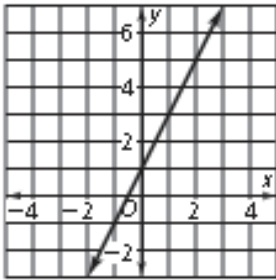
73.  $-6x - 2y \leq 4$

74.  $x - 3y > -3$

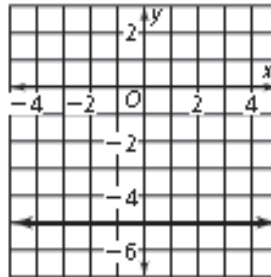


**Linear Equations - Write an equation in slope-intercept form of each line.**

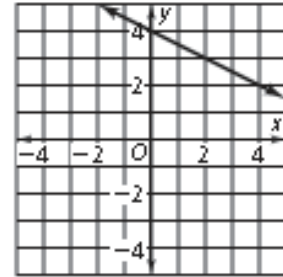
75.



76.



77.



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

78. (3, 5) and (0, 4)

79. (2, 6) and (-4, -2)

80. (-1, 3) and (-3, 1)

**Write an equation, in slope-intercept form, of the line that passes through the given point and satisfies the given condition.**

81. (-2, 3); parallel to  $y = 4x - 3$

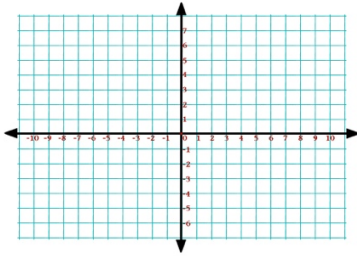
82. (3, 7); parallel to  $y = -3x + 6$

83. (-1, -4); perpendicular to  $y = 2x + 5$

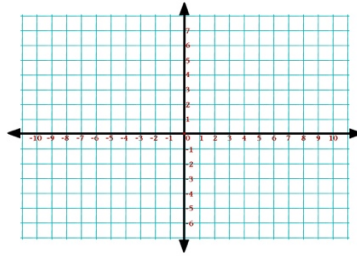
84. (6, -2); perpendicular to  $y = -5x - 7$

Graph each equation.

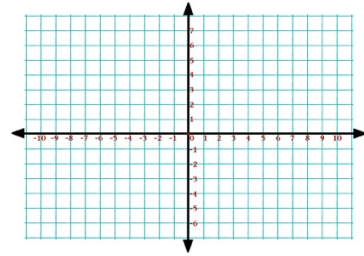
85.  $y = 3x - 2$



86.  $y = \frac{1}{4}x - 1$



87.  $y = -x + 6$



Find the slope and the y-intercept of the graph of each equation.

88.  $y + 4 = -6x$

89.  $y + \frac{1}{2}x = -4$

90.  $3y - 12x + 6 = 0$

Write an equation in point-slope form of the line through the given points. Then write the equation in slope-intercept form.

91.  $(4, 0), (-2, 1)$

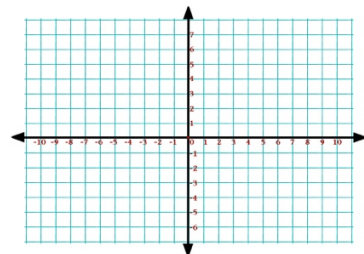
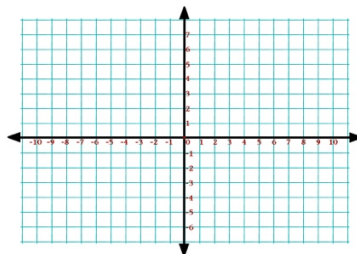
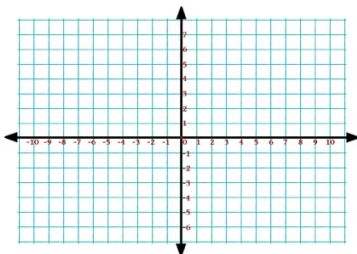
92.  $(-3, -2), (5, 3)$

Graph each equation.

93.  $y - 2 = 2(x + 3)$

94.  $y + 3 = -2(x + 1)$

95.  $y + 1 = -\frac{3}{5}(x + 5)$



Find the  $x$ - and  $y$ -intercepts and the slope of the graph of each equation.

96.  $2x + 3y = -6$

97.  $x - 3y = 9$

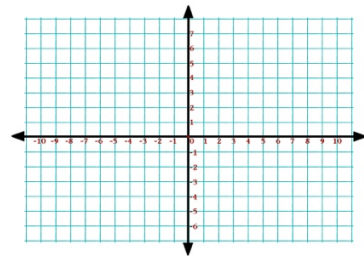
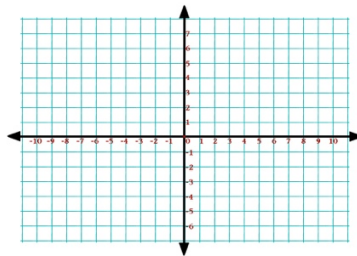
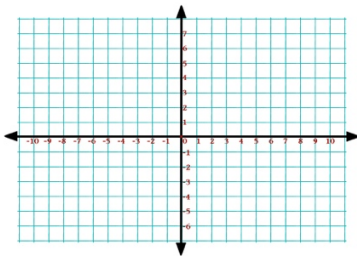
98.  $5x - 4y = -12$

Graph each equation using a zero and the  $y$ -intercept.

99.  $-5x + 2y = -10$

100.  $-3x - 6y = 12$

101.  $4x - 12y = -24$



For each equation, tell whether its graph is a *horizontal* or a *vertical* line.

102.  $y = -2$

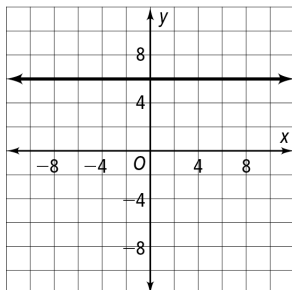
103.  $x = 0$

104.  $y = -0.25$

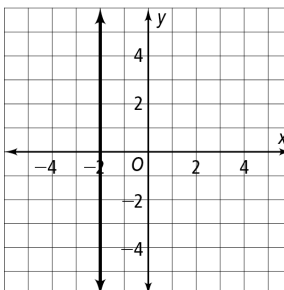
105.  $x = -\frac{3}{5}$

Write an equation for each horizontal or vertical line.

106.



107.



**Applications: Define all variables, write an equation, and solve.**

108. The membership to your local video store is \$10 per year and the DVD rental rate is \$3.95 per DVD. Write an equation that models the total amount of money you will spend on DVD rentals this year.

109. The price for U.S. Postage stamps has increased over the years. Since, 1975, the price has increased from \$0.13 to \$0.37 in 2005 at a rate that is approximately linear.

A. Write a linear model for the price of stamps during this time period. Let  $p$  represent the price and  $t$  represent the number of years since 1975.

B. What would you expect the price of a stamp to be in 2015?

110. You have a piece of wood that is 72 inches long. You cut the wood into three pieces. The second piece is 6 inches longer than the first piece. The third piece is 6 inches longer than the second piece. Draw a diagram and then write and solve an equation to find the lengths of the three pieces.

111. You want to tape five posters on a wall so that the spaces between posters are the same. You also want the spaces at the left and right of the group of posters to be three times the space between any two adjacent posters. The wall is 15 feet wide and the posters are 1.5 feet wide. Draw a diagram and then write and solve an equation to find how to position the posters.

112. A Moving company weighs 20 boxes you have packed that contain either books or clothes and says the total weight is 404 pounds. You know that a box of books weighs 40 pounds and a box of clothes weighs 7 pounds. Write and solve an equation to find how many boxes of books and how many boxes of clothes you packed.

## Factoring

Factor out the Greatest Common Factor (GCF) in each expression.

113.  $10x^2y - 15xy^2$

114.  $-3n^3 + 12n^2 - 30n$

115.  $6r^2s - 3rs + 21rs^2$

Factor each trinomial.

116.  $t^2 - 2t - 35$

117.  $x^2 - 7x + 12$

118.  $51 - 20x + x^2$

Factor each difference of squares or perfect square trinomial.

119.  $x^2 - 49$

120.  $16n^2 - 9$

121.  $w^2 + 16w + 64$

122.  $y^2 - 10y + 25$

123.  $16b^2 - 40b + 25$

124.  $4m^2 - 25$

Factor completely.

125.  $12x^2 - 27$

126.  $4x^2 - 25x - 56$

127.  $2x^2 - 19x + 24$

128.  $-6y^2 - 9y + 60$

129.  $24b^2 - 24b - 18$

130.  $48x^2y - 3y$