

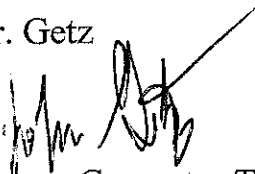
# Honors Geometry

## Summer Assignment

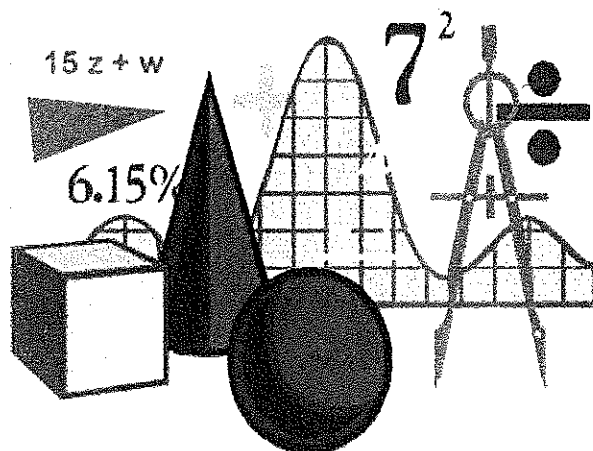
Dear Freshman,

Congratulations on choosing to study Honors Geometry. The attached assignment has topics from Algebra that we will use in our Geometry classes. For each topic, there is a review section along with questions to be completed. Please complete the work for each question on the worksheet and write your answers on the attached answer page. The assignment is due on the first day of class in September. There are a number of online resources if you need more than the review that is in this packet. I look forward to teaching you this fall.

Mr. Getz



Honors Geometry Teacher



Name \_\_\_\_\_ Date \_\_\_\_\_

**Write an equation:**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_

- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_
- 11. \_\_\_\_\_
- 12. \_\_\_\_\_

**Distance Formula:**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. a. \_\_\_\_\_  
b. \_\_\_\_\_

- 13. \_\_\_\_\_
- 14. \_\_\_\_\_
- 15. \_\_\_\_\_
- 16. \_\_\_\_\_

**Solving Systems:**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_

**Factoring Quadratics:**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_

## Geometry Honors- Summer Assignment

### *Reference Sheet*

I. Linear Equations: A **linear** equation is an equation for a straight **line**

**These are all linear equations:**

$$y = 2x + 1$$

$$5x = 6 + 3y$$

$$y/2 = 3 - x$$

### Slope:

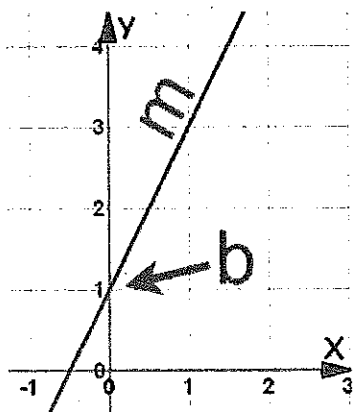
The slope of a line is a number that measures its "steepness", usually denoted by the letter  $m$ . It is the change in  $y$  for a unit change in  $x$  along the line (rate of change).

Given two points  $(x_1, y_1)$  and  $(x_2, y_2)$ , you can find the slope of a line using the formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

### Slope-Intercept Form

The most common form is the slope-intercept equation of a straight line:



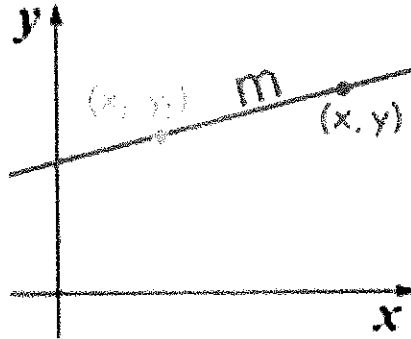
$$y = \textcircled{m}x + \textcircled{b}$$

Slope Y Intercept

### Point-Slope Form

Another common one is the Point-Slope Form of the equation of a straight line:

$$y - y_1 = m(x - x_1)$$



**Example:**

Given  $m = \frac{1}{4}$  and the point  $(2, 3)$

$$y - 3 = \frac{1}{4}(x - 2)$$

### General Form

There is also the Standard Form of the equation of a straight line:

$$Ax + By + C = 0$$

(A and B cannot both be 0 and A cannot be a negative number)

**Example:**  $5x + 3y = 15$

**Write an equation in slope-intercept form from the given information.**

1. slope = 3,  $y$ -intercept =  $-1$  \_\_\_\_\_

2. slope = 5, goes through the point  $(2, 7)$  \_\_\_\_\_

3. slope = 0, goes through the point  $(-3, 3)$  \_\_\_\_\_

4. goes through the points  $(6, 2)$  and  $(5, 4)$  \_\_\_\_\_

5. goes through the points  $(0, 4)$  and  $(2, 7)$  \_\_\_\_\_

6.  $y$ -intercept = 4, goes through the point  $(2, 3)$  \_\_\_\_\_

7.  $x$ -intercept =  $-1$ , goes through the point  $(3, 8)$  \_\_\_\_\_

Reference Sheet

**II. The Distance Formula**

To calculate the distance  $d$  of a line segment with endpoints  $(x_1, y_1)$  and  $(x_2, y_2)$  use the Formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

**Example:** Find the distance between the given points:

$$(5, -3) \text{ and } (1, 7)$$

$$d = \sqrt{(5-1)^2 + (-3-7)^2}$$

$$d = \sqrt{16+100}$$

$$d = \sqrt{116}$$

$$d = 2\sqrt{29}$$

Use the Distance formula to answer the following questions. Be sure to leave your answer in **simplest radical form**.

1. Find the length of the line segment whose endpoints are  $(-8,7)$  and  $(6,4)$ .
2. Find the distance between the points  $(3,5)$  and  $(12,2)$ .
3. The point  $(-3,-6)$  lies on a circle. What is the length of the radius of this circle if the center is located at  $(9,-2)$ ?

4. Find the distance AC

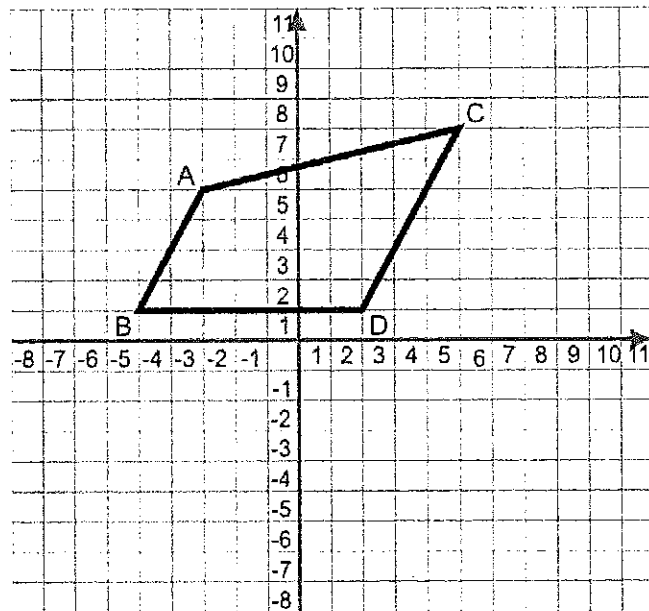
5. Find the Slope AC

6. Find the distance AB

7. Find the distance BD

8. Find the Slope AD

9. Find the Slope DC



10. Use the distance formula to solve:

a. The point  $(1,2)$  lies on a circle. What is the length of the radius of this circle if the center is located at  $(4,6)$ ?

b. The point  $(-2,-1)$  lies on a circle. What is the length of the **diameter** of this circle if the center is located at  $(0,4)$ ?

Reference Sheet

III. Factoring Quadratics in the form:  $ax^2 + bx + c$

Factoring when a=1

$$x^2 - 3x - 10$$

What are the factors of "C" that sum up to give me "B"

Factors of -10 : 1 and -10

-1 and 10

2 and -5

-2 and 5



Answer:  $(x + 2)(x - 5)$

Factoring when a≠1

$$3x^2 - x - 2$$

Step 1: Multiply a and c  $\longrightarrow 3x^2 * -2 = -6x^2$

Step 2: Find the factors of -6 that combine to give you -1  $\longrightarrow -3 \text{ and } 2 = -1$

Step 3: Plug your factors back in to the original equation.  $\longrightarrow 3x^2 - 3x + 2x - 2$

Step 4: Group your equation and factor each binomial.  $\longrightarrow (3x^2 - 3x)(2x - 2)$

$$3x(x - 1)2(x - 1)$$

Answer!!!  $(3x + 2)(x - 1)$



### Difference of Squares:

$$\begin{array}{ccc} & 4x^2 - 9 & \\ & \swarrow \quad \searrow & \\ (2x)^2 & - & (3)^2 \end{array}$$

Because  $4x^2$  is  $(2x)^2$ , and  $9$  is  $(3)^2$ ,

we have:

$$4x^2 - 9 = (2x)^2 - (3)^2$$

And that can be produced by the difference of squares formula:  $(a + b)(a - b) = a^2 - b^2$

Where **a** is  $2x$ , and **b** is  $3$ .

So let us try doing that:

$$(2x + 3)(2x - 3) = (2x)^2 - (3)^2 = 4x^2 - 9$$

**Yes!**

So the factors of  $4x^2 - 9$  are  $(2x + 3)$  and  $(2x - 3)$ :

**Answer:**  $4x^2 - 9 = (2x + 3)(2x - 3)$

### Solving quadratics using the Quadratic Formula

Given a quadratic equation of the form  $ax^2 + bx + c = 0$ , substitute the values of  $a$ ,  $b$ , and  $c$  into the formula to find the solution of the quadratic equation.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Factor each quadratic:**

1) $2a^2 + 15a + 25$	2) $f^2 + 14f + 49$
3) $4c^2 - 9c - 9$	4) $h^2 + 20hj + 100j^2$
5) $2f^2 + 9f + 10$	6) $a^2 - 36$
7) $4g^2 - 17g + 15$	8) $49 - d^2$
9) $2h^2 - 7hj - 4j^2$	10) $b^2 - 2$

**Solve each quadratic using the Quadratic formula:**

11) $4x^2 + 8x + 1 = 0$	12) $3x^2 + 6x + 2 = 0$
13) $3x^2 - 4x = 5$	14) $6x^2 - x - 2 = 0$
15) $5x^2 + 1 = -10x$	16) $3x^2 = 4x + 2$

Reference Sheet

**System of Linear Equations**

A **system of linear equations** means two or more linear equations. If these two linear equations intersect, that point of intersection is called the **solution** to the system of linear equations

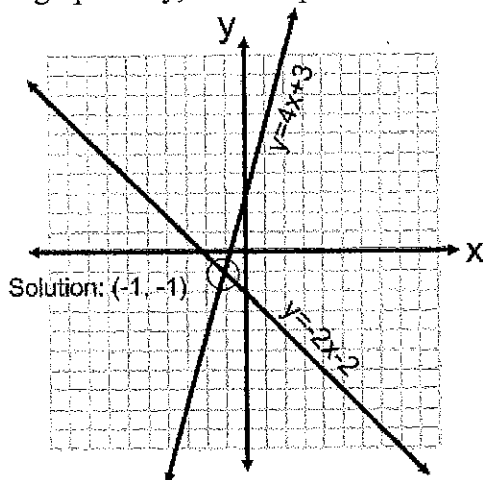
There are 3 methods for solving a system of linear equations:

1. **Graphically**

$$y = 4x + 3$$

$$y = -x - 2$$

To solve a system of equations graphically, find the point of intersection of the given equations.



2. **Substitution**

**Example 1.**

$$y = x - 2$$

$$y = -2x - 2$$

Step 1: Substitute one equation back in for y.  $\longrightarrow$   $x - 2 = -2x - 2$

Step 2: Solve  $\longrightarrow$   $x - 2 = -2x - 2$

$$3x = 0$$

$$x = 0$$

Step 3: Plug back in the value of  $x$  into an original equation to find the value of  $y$ .

$$y = (0) - 2$$

$$y = -2$$

**Example 2.**

$$(Eq. 1) \quad 2x + y = 2$$

$$(Eq. 2) \quad 3x + 5y = 8$$

Step 1: Isolate a variable (*Eq. 1 for y*)  $\longrightarrow$   $y = -2x + 2$

Step 2: Substitute the value of y back into the other equation  $\longrightarrow$   $3x + 5(-2x + 2) = 8$

Step 3: Solve

$$3x - 10x + 10 = 8$$

$$-7x = -2$$

$$x = \frac{2}{7} \quad \text{Now find y!} \quad (y = \frac{10}{7})$$

### 3. Elimination

**Example 1:**

$$-6x + 5y = 1$$

$$6x + 4y = -10$$

Step 1: Be sure each equation is in standard form

Step 2: Eliminate one variable. Since the sum of the coefficient on x is 0, add the equations to eliminate x.

$$\begin{array}{r} \cancel{-6x} + 5y = 1 \\ \cancel{6x} + 4y = -10 \\ \hline 9y = -9 \\ y = -1 \end{array}$$

Step 3: Substitute y back into an original equation to find x. ( $x = -1$ )

**Example 2:**

$$4x + y = -2$$

$$2x + 3y = -1$$

Step 1: Be sure each equation is in standard form.

Step 2: Eliminate one variable. You can multiply  $2x + 3y = -1$  by  $-2$  and then add.

$$-2(2x + 3y = -1) \longrightarrow -4x - 6y = 2$$

$$\begin{array}{r} 4x + y = -2 \\ -4x - 6y = 2 \\ \hline -5y = 0 \\ y = 0 \end{array}$$

Step 3: Substitute  $y$  back into an original equation to find  $x$ . ( $x = -1/2$ )

**Solve the following systems choosing your own method.**

1.  $-x + 4y = 5$                        $x + 4y = 11$

2.  $3x - y = 7$                        $4x - 2y = 8$

3.  $2y + 5x = 35$                        $y = 4x - 28$

4.  $5x - 4y = -39$                        $-3x - 4y = -15$

5.  $y = -5x + 59$                        $4x + y = 49$

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

7. Miss Lee has 24 coins consisting of nickels and quarters. The total value of the coins is \$3.00. How many of each kind does Miss Lee have?
8. Two friends bought some markers and pens. The first bought 4 markers and 5 pens and it cost him \$6.71. The second friend bought 5 markers and 3 pens, which cost her \$7.12. What is the price for one marker and one pen?
9. The ticket price for the movies is \$7.50 for children and \$10.50 for adults. One night 825 people bought tickets and \$8005.50 was collected from ticket sales. How many children and how many adults bought tickets.
10. A builder placed two orders with the hardware store. The first order was for 25 sheets of plywood and 4 boxes of nails and the bill totaled \$357. The second order was for 35 sheets of plywood and 2 boxes of nails and the bill totaled \$471. The bills do not list the per-item price. What were the prices of one piece of plywood and one box of nails?

Additional information on the following websites

For examples visit:

[Purplemath.com](http://Purplemath.com)

For videos visit:

[Khanacademy.com](http://Khanacademy.com)

[youtube](https://www.youtube.com)