# Pre-AP Geometry - Summer Assignment

Welcome to Pre-AP Geometry! In order to ensure that you are fully prepared for Geometry and set for success, you are strongly encouraged to complete the following summer assignment before school starts. It will be due as a grade the 2nd week of school.  It will cover key Algebra 1 concepts that should serve as a review of prior learning and essential for the start of Geometry.

- Solving linear equations
- Graphing linear equations
- Finding slope from ordered pairs and/or linear equations.
- Writing equations of lines in slope-intercept, point-slope and standard forms
- Multiplying binomials
- Solving quadratic equations by factoring
- Simplifying radicals
- Solving right triangles using the Pythagorean Theorem

All work must be shown. Please use PENCIL only, on separate paper

Included at the back of the packet are examples of each section.
Also, for your benefit here is a great website for review.
 http://www.khanacademy.org/

Please bring this completed Geometry review packet to the first class meeting. We will go over simplifying radicals              at that time. We will review the information, then an assessment will be given over this information

Please keep your work neat and organized.

Happy Summer !
Mrs. Grigor

**This assignment should be completed without the use of a calculator**
<u>**Show all work**</u> **on separate paper for credit.**

**B.  Solve each proportion**

1. $\dfrac{4}{3} = \dfrac{8}{x}$                2. $\dfrac{7}{b+5} = \dfrac{10}{5}$         3. $\dfrac{5}{6} = \dfrac{7n+9}{9}$         4. $\dfrac{p+10}{p-7} = \dfrac{8}{9}$

**D. Solve. Leave answers as improper fractions. (No decimals or mixed numbers).**

1. $4(3n + 5) - 2(2 - 4n) = 6 - 2n$           6. $\frac{1}{3}(6x + 24) - 20 = \frac{1}{4}(12x - 72)$

2. $3x - 12 - 5x = 5 - 6x - 9$              7. $13 - (2c + 2) = 2(c + 2) + 3c$

3. $2(4x) - (x - 1) = 2(1 - x)$             8. $\frac{1}{4}(8y + 4) - 17 = -\frac{1}{2}(4y - 8)$

4. $6x - 14 = 28$                             9. $12 - 3(x - 5) = 21$

5. $\frac{x}{5} = 12$                               10. $\frac{x-12}{2} = 27$

**E.  Clear the fractions first, and then solve.**

1. $\frac{2}{3}x - \frac{1}{6} = 7$                       3. $\frac{2}{3}x - \frac{5}{6} = \frac{1}{2}x - 4$

2. $\frac{2}{15} - \frac{3}{5}x = \frac{7}{15} + \frac{2}{3}x$           4. $-\frac{1}{3}x - \frac{4}{3} = -\frac{3}{4}x - \frac{8}{5}$

**F. Find the slope of the line containing each pair of points.**

1. ( 5,0 ) and ( 6,8 )           2. (4, 3) and ( 6, 4)           3. (2, 4) and (9, 7)

**G. Find the slope of each line.**

1. $y = 7$                2. $x = -4$                3. $2x + y = 15$                4. $x - 2y = 7$

**H. Find the equation of the line with the given slope through the given point.
Write the answer in *slope-intercept* form.**

**1.** $m = -\frac{4}{3}$; (3, 1)                2. $m = 4$; (3, 2)                3. Undefined slope; (2, 1)

**I. Write the equation of the line in slope-intercept form**

1. The line with x-intercept 4 and y-intercept of - 5                2. The line containing (0,3) and (2,0)

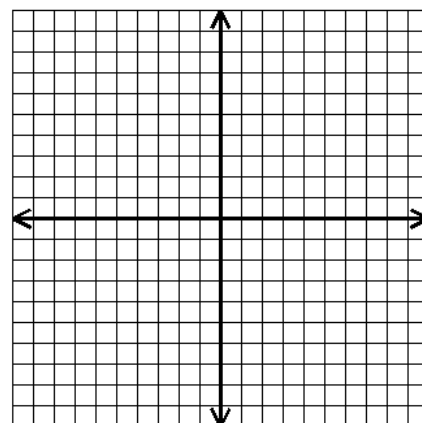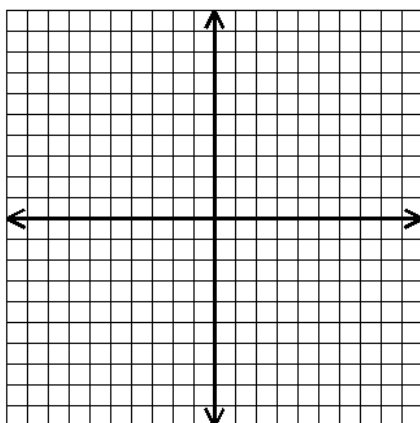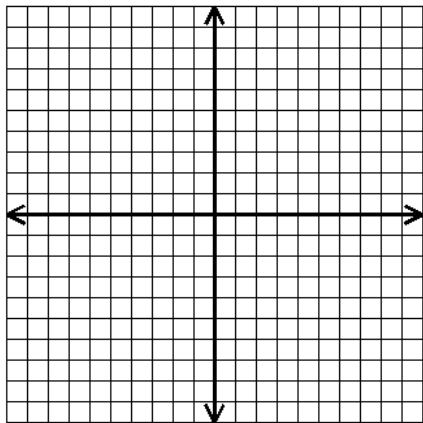**3**. The line containing (3,1) and (4,8)                4. The line with slope $\frac{4}{5}$ and containing (-1,7)

**J. Graph the following equations.**

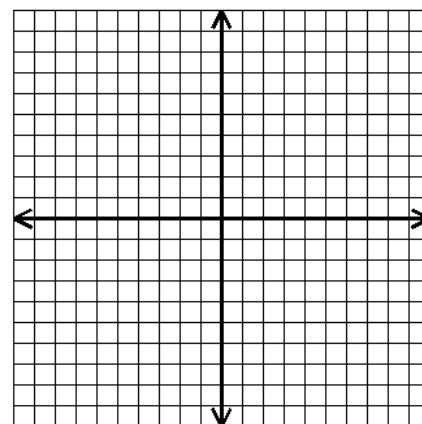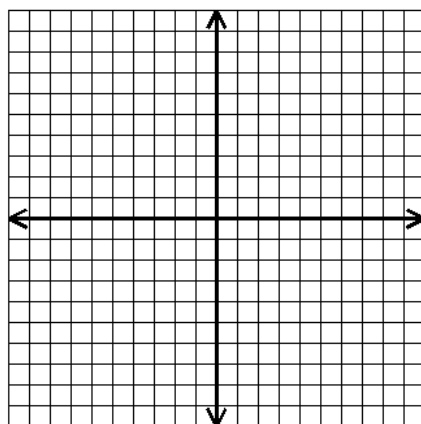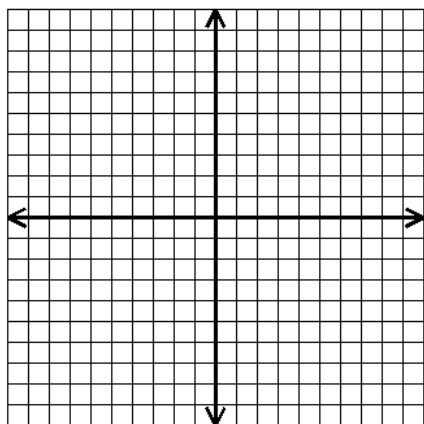1. $y - 3 = 2(x - 1)$                2. $y = -\frac{2}{5}x - 3$                3. $3x - 2y = 12$

**4. y = 3**                **5. x = -1**                **6. 4x + 6y = 12**

**K. Multiply the following binomials.**

1. $(x - 3)(x + 7)$

2. $(x + 8)^2$

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

4. $(2x - 1)(5x + 3)$

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

6. $(7m - 1)(2m - 3)$

**L. Factor each of the following polynomials.**

1. $x^2 + 8x + 15$

2. $a^2 - 14a + 48$

3. $x^2 + x - 42$

4. $x^2 - 7x - 18$

5. $x^2 - 16x + 64$

6. $x^2 - 81$

**M. Solve by factoring:**

1. $(k + 5)(k - 5) = 0$

2. $y^2 - 10y + 21 = 0$

3. $x^2 - 81 = 0$

4. $x^2 + 7x + 6 = 0$

5. $x^2 + 3x = 8x - 6$

6. $16p^2 - 25 = 0$

**N. Use Pythagorean Theorem to find the missing side of the right triangles. If c is the measure of the hypotenuse of a right triangle, find each missing measure. Round to the nearest hundredth if necessary.**
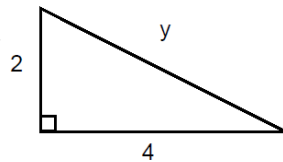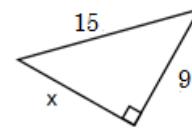
1. a = 5, b = 12, c = ?

2. a = 6, b = 3, c = ?

3. a = ?, b = 6, c = 14

4. a = 4, b = ?, c = 10

5.

6.

7. In little league baseball, the distance of the paths between each pair of consecutive bases is 60 feet and the paths form right angles. How far does the ball need to travel if it is thrown from home plate directly to second base?

# <u>Examples</u> for Summer Packet Mansfield High School

**A-D** **The five steps to solving an equation are:**
- ✓ Get rid of parentheses
- ✓ Simplify the left side and the right side of the equation as much as possible, i.e. combine any and all like terms
- ✓ Get the variable term on just one side
- ✓ Get the variable term by itself
- ✓ Solve for the variable.

Remember, you always use the opposite operation to "get rid" of something.

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**E** **TO SOLVE AN EQUATION WITH fractions**, we transform it into an equation without fractions -- which we <u>know</u> how to solve. The technique is called clearing of fractions

Multiply both sides of the equation -- every term -- by the <u>LCM</u> of denominators. Every denominator will then <u>cancel</u>. We will then have an equation without fractions.

Example:

| | |
|---|---|
| $x + \dfrac{2}{3} = \dfrac{1}{2}$ | Original equation. |
| $6\left(x + \dfrac{2}{3}\right) = 6\left(\dfrac{1}{2}\right)$ | Multiply both sides by 6. |
| $6x + 6\left(\dfrac{2}{3}\right) = 6\left(\dfrac{1}{2}\right)$ | On the left, distribute the 6. |
| $6x + 4 = 3$ | Multiply: $6\left(\dfrac{2}{3}\right) = 4$, $6\left(\dfrac{1}{2}\right) = 3$. |

Note that the fractions are now cleared from the equation. Now solve the problem.

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**F-G** **Slope Formula** $\qquad m = \dfrac{y_2 - y_1}{x_2 - x_1}$ $\qquad$ Example: (1, -3) and (4, 5) $\quad m = \dfrac{5 - -3}{4 - 1} = \dfrac{8}{3}$

**H** **Slope intercept formula:** $\qquad y = m\,x + b$ $\qquad$ m is the slope and b is the y intercept

> Special Cases:
> Horizontal lines are $y = a\ number$ slope is "0"
> Vertical line $x = a\ number$ $\qquad$ slope is "No slope"

**I** **Point slope formula:** $\qquad y - y_1 = m(x - x_1)$

Example: 3x + 4y = 12 $\qquad$ *have to solve for y*
$\quad$ -3x $\qquad$ -3x $\qquad$ *subtract 3x from both sides to get y by itself*
$\quad$ 4y = -3x + 12 $\qquad$ *next divide everything by 4*
$\quad$ 4 $\quad$ 4 $\quad$ 4

$y = -\dfrac{3}{4}x + 3$ $\qquad$ Slope is $-\dfrac{3}{4}$ $\qquad$ y intercept is (0, 3) or 3

Use point slope when you have a point and slope and want an equation of a line in slope intercept. Solve the equation for y once the point($x_1$, $y_1$) and slope(m) are plugged in.

Example: $y - (-2) = -\dfrac{2}{3}(x - 6)$ $\qquad$ plug in ordered pair and slope

$\qquad y + 2 = -\dfrac{2}{3}x + 4$ $\qquad$ Distribute

$\qquad -2 \qquad\quad -2$

$\qquad y = -\dfrac{2}{3}x + 2$ $\qquad$ Solve for "y", now equation is in slope intercept form

## $\boxed{J}$ Graphing a line.

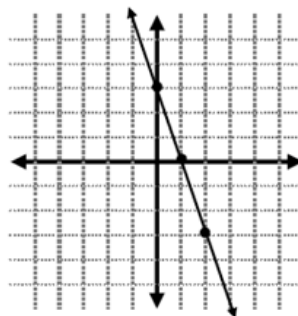$$y = -\frac{1}{3}x + 3 \qquad \text{Equation}$$

$$m = -\frac{1}{3} \qquad \text{Pull out slope and y-intercept}$$

b= 3
(y intercept)
Graph y-intercept
Use slope to graph other points

When Graphing, take equation solve for slope intercept form, then use the steps from above.

## $\boxed{K}$ Multiplying Binomials: FOIL!

$$(2x-4)(3x+5) = 6x^2 + 10x - 12x - 20 = \underbrace{6x^2 - 2x - 20}_{\text{combine like terms}}$$

First terms   Outer terms   Inner terms   last terms

$$(3x-4)^2 = (3x-4)(3x-4) = 9x^2 - 12x - 12x + 16 = \underbrace{9x^2 - 24x + 16}_{\text{combine like terms}}$$

First terms   Outer terms   Inner terms   last terms

## $\boxed{L}$ Factoring Examples:

1) $a^2 - b^2 = (a+b)(a-b)$     EX: $a^2 - 16 = (a+4)(a-4)$; $25a^2 - 36x^2 = (5a + 6x^2)(5a - 6x^2)$

2) $a^2 + 2ab + b^2 = (a+b)^2$     EX: $k^2 + 10k + 25 = (k+5)(k+5) = (k+5)^2$
$k^2$ & $25$ are perfect squares & $10 = 2(1 \cdot 5)$

3) $a^2 - 2ab + b^2 = (a-b)^2$     EX: $4x^2 - 12x + 9 = (2x-3)(2x-3) = (2x-3)^2$
$4x^2$ & $9$ are perfect squares & $12 = 2(2x \cdot 3)$

4) $ax^2 + bx + c$     EX: $x^2 + 6x + 8 = (x+4)(x+2)$ since $4 + 2 = 6$ and $4 \cdot 2 = 8$

$ax^2 - bx + c$     $x^2 - 8x + 15 = (x-3)(x-5)$ since $^-3 + ^-5 = ^-8$ and $^-3 \cdot ^-5 = 15$

$ax^2 + bx - c$     $a^2 + 12a - 45 = (a+15)(a-3)$ since $15 + ^-3 = 12$ and $15 \cdot ^-3 = ^-45$

$ax^2 - bx - c$     $y^2 - y - 12 = (y+3)(y-4)$ since $3 + ^-4 = -1$ and $3 \cdot ^-4 = ^-12$

## $\boxed{M}$ Solve by factoring:

$$a^2 + 12a - 45 = (a+15)(a-3) \qquad \text{First factor the problem}$$

$$a + 15 = 0 \quad and \quad a - 3 = 0 \qquad \text{Make each factor equal to zero and solve for "x"}$$

$$\underline{-15 \quad -15} \qquad \underline{+3 \quad +3}$$

$$a = -15 \qquad\qquad a = 3 \qquad \text{Answer}$$

**N** Pythagorean Theorem a² + b² = c², *a* and *b* are the legs and *c* is the hypotenuse (longest side).

$a = 3, b = 6, c = ?$

| | |
|---|---|
| $a^2 + b^2 = c^2$ | Pythagorean Theorem |
| $3^2 + 6^2 = c^2$ | Plug in values |
| $9 + 36 = c^2$ | square numbers |
| $45 = c^2$ | combine numbers |
| $\sqrt{45} = \sqrt{c^2}$ | square root both sides |
| $6.71 = c$ | answer |

$a = 4, b = ?, c = 12$

| | |
|---|---|
| $a^2 + b^2 = c^2$ | Pythagorean Theorem |
| $4^2 + b^2 = 12^2$ | Plug in values |
| $16 + b^2 = 144$ | square numbers |
| $b^2 = 120$ | Get all numbers on one side |
| $\sqrt{b^2} = \sqrt{120}$ | square root both sides |
| $b = 10.95$ | answer |