## Pre-AP Geometry - Summer Assignment 2019

Dear Prospective Mansfield High School Pre – AP Geometry Student,

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
- Solving literal equations

Leave answers in simplified radical form or improper fractions (no decimals). All work must be shown.

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 review the information, then an assessment will be given over this information the 2nd week of school. The assessment will be non-calculator and you will not be able to use the EOC chart.

We look forward to meeting you in August!

Regards,
The MHS Pre-AP Geometry Team

**PAP Geometry** **Name ___________________**
**Summer Assignment 2019**

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

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

1. $4(3n + 5) - 2(2 - 4n) = 6 - 2n$
2. $3x - 12 - 5x = 5 - 6x - 9$
3. $2(4x) - (x - 1) = 2(1 - x)$
4. $6x - 14 = 28$
5. $\frac{x}{5} = 12$
6. $\frac{1}{3}(6x + 24) - 20 = \frac{1}{4}(12x - 72)$
7. $13 - (2c + 2) = 2(c + 2) + 3c$
8. $\frac{1}{4}(8y + 4) - 17 = -\frac{1}{2}(4y - 8)$
9. $12 - 3(x - 5) = 21$
10. $\frac{x-12}{2} = 27$

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

1. $\frac{2}{3}x - \frac{1}{6} = 7$
2. $\frac{2}{15} - \frac{3}{5}x = \frac{7}{15} + \frac{2}{3}x$
3. $\frac{2}{3}x - \frac{5}{6} = \frac{1}{2}x - 4$
4. $-\frac{1}{3}x - \frac{4}{3} = -\frac{3}{4}x - \frac{8}{5}$

**C. 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)

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

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

**E. 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)

**F. Write the equation of the line in standard form.**

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

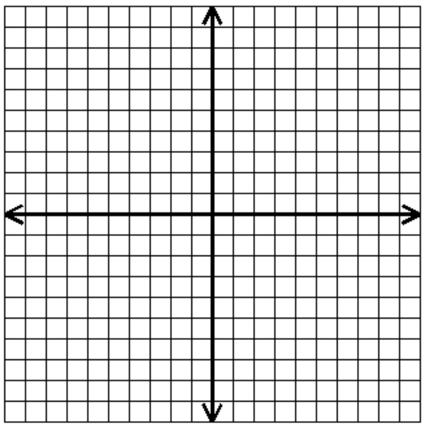
**G. Write the equation of the line in slope-intercept form.**

1. The line containing (3,1) and (4,8)

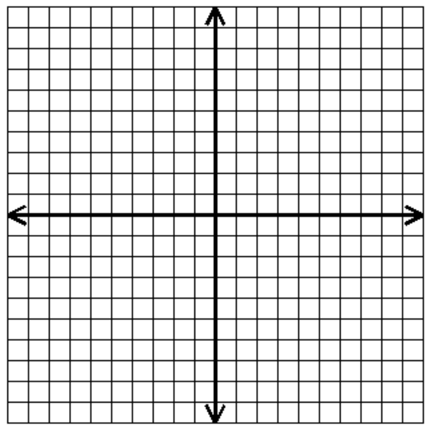
2. The line with slope $\frac{4}{5}$ and containing (-1,7)

**H. Graph the following equations.**

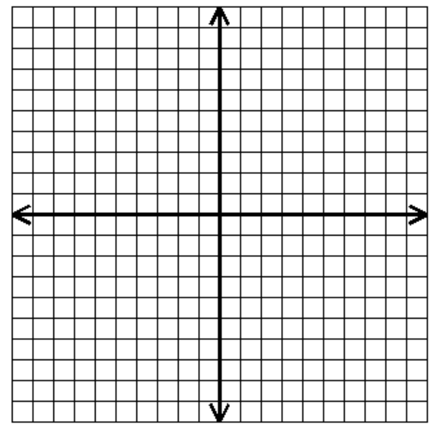
1. $y - 3 = 2(x - 1)$



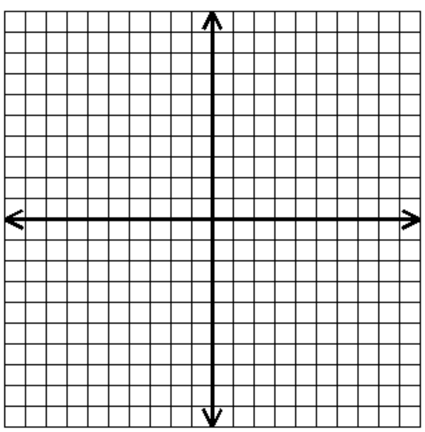
2. $y = -\frac{2}{5}x - 3$



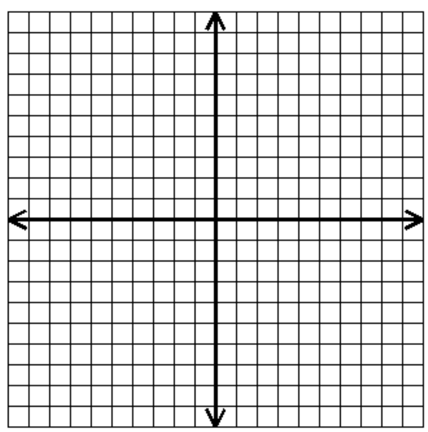
3. $3x - 2y = 12$



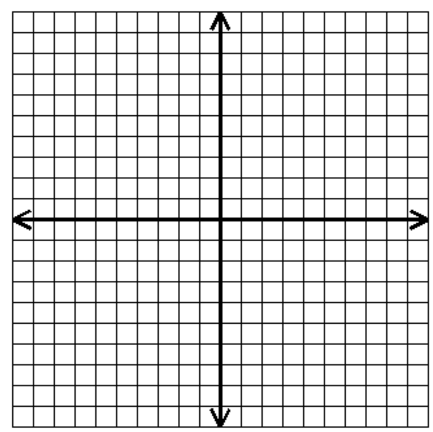
**4. $y = 3$**



**5. $x = -1$**



**6. $4x + 6y = 12$**



**I. 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. $(7m - 1)(2m - 3)$

**J. 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. $x^2 - 81$

**K. Solve by factoring:**

1. $(k+ 5)(k - 5) = 0$ 2. $y^2 - 10y + 21 = 0$

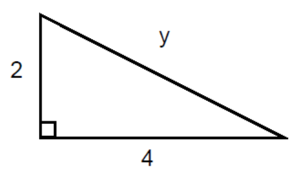
3. $x^2 - 81 = 0$ 4. $x^2 + 7x + 6 = 0$

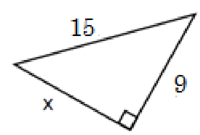
5. $x^2 + 3x = 8x - 6$ 6. $16p^2 - 25 = 0$

L. **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?

**M. Simplify the following radicals (no decimals- should be in simplified radical form)**

**1.** $\sqrt{18}$ **2.** $\sqrt{24}$ **3.** $\sqrt{27}$

**4.** $\sqrt{32}$ **5.** $\sqrt{40}$ **6.** $\sqrt{45}$

**7.** $\sqrt{48}$ **8.** $\sqrt{162}$ **9.** $\sqrt{75}$

**10.** $\sqrt{192}$ **11.** $\sqrt{12}$ **12.** $\sqrt{54}$

**N. Solve the literal equation for the given variable:**

**1.** $V= lwh$**; solve for w** **2.** $6y + 2x = 18$**, for y** **3.** $p = 2\ell + 2w$**, for p**

**4.** $S = 2pl + B$**, for p** **5.** $ax+ by = c$**, for y** **6.** $6(x+ 3y) = -5$**, for y**

# Examples for Summer Packet Mansfield High School

**A. 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.

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

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

Example:

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

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

**C. Slope Formula** $\quad m = \frac{y_2 - y_1}{x_2 - x_1}$ $\quad$ Example: (1, -3) and (4, 5) $\quad m = \frac{5 - -3}{4 - 1} = \frac{8}{3}$

**D. Slope intercept formula:** $\quad y = m\,x + b$ $\quad$ m is the slope and b is the y intercept

**E. Point slope formula:** $\quad y - y_1 = m(x - x_1)$

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

| | |
|---|---|
| Example: 3x + 4y = 12 | *have to solve for y* |
| -3x $\quad$ -3x | *subtract 3x from both sides to get y by itself* |
| 4y = -3x + 12 | next divide everything by 4 |
| 4 $\quad$ 4 $\quad$ 4 | |
| $y = -\frac{3}{4}x + 3$ | Slope is $-\frac{3}{4}$ $\quad$ 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.

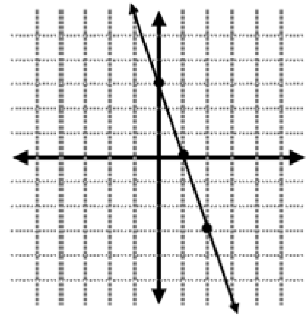
| | |
|---|---|
| Example: $y-(-2)=-\frac{2}{3}(x-6)$ | plug in ordered pair and slope |
| $y+2=-\frac{2}{3}x+4$ | Distribute |
| $-2 \qquad -2$ | |
| $y=-\frac{2}{3}x+2$ | Solve for "y", now equation is in slope intercept form |

**F. Use information from C,D, E to figure out F.**

**G. Use information from C,D, E to figure out G.**

**H. Graphing a line.**

| | | |
|---|---|---|
| $y=-\frac{1}{3}x+3$ | Equation | |
| $m=-\frac{1}{3}$ | Pull out slope and y-intercept | |
| *b= 3* | Graph y-intercept | |
| *(y intercept)* | Use slope to graph other points | |



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

**I. Multiplying Binomials: FOIL!**

$$(2x-4)(3x+5)=\underset{\substack{First\\terms}}{6x^2}+\underset{\substack{Outer\\terms}}{10x}-\underset{\substack{Inner\\terms}}{12x}-\underset{\substack{last\\terms}}{20}=\underbrace{6x^2-2x-20}_{combine\ like\ terms}$$

$$(3x-4)^2=(3x-4)(3x-4)=\underset{\substack{First\\terms}}{9x^2}-\underset{\substack{Outer\\terms}}{12x}-\underset{\substack{Inner\\terms}}{12x}+\underset{\substack{last\\terms}}{16}=\underbrace{9x^2-24x+16}_{combine\ like\ terms}$$

**J. Factoring Examples:**

1) $a^2-b^2=(a+b)(a-b)$ EX: $a^2-16=(a+4)(a-4)$; $25a^2-36x^6=(5a+6x^3)(5a-6x^3)$

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 & $10=2(1\bullet 5)$

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 & $12=2(2x\bullet 3)$

4) $ax^2+bx+c$ EX: $x^2+6x+8=(x+4)(x+2)$ since $4+2=6$ and $4\bullet 2=8$
$ax^2-bx+c$ $x^2-8x+15=(x-3)(x-5)$ since $^-3+{}^-5={}^-8$ and $^-3\bullet{}^-5=15$
$ax^2+bx-c$ $a^2+12a-45=(a+15)(a-3)$ since $15+{}^-3=12$ and $15\bullet{}^-3={}^-45$
$ax^2-bx-c$ $y^2-y-12=(y+3)(y-4)$ since $3+{}^-4=-1$ and $3\bullet{}^-4={}^-12$

**K. Solve by factoring:**

| | |
|---|---|
| $a^2+12a-45=(a+15)(a-3)$ | First factor the problem |
| $a+15=0$ *and* $a-3=0$ | Make each factor equal to zero and solve for "x" |
| $-15\ \ -15$ $\quad +3\ \ +3$ | |
| $a=-15$ $\quad a=3$ | Answer |

**L. Pythagorean Theorem $a^2 + b^2 = c^2$, *a* and *b* are the legs and *c* is the hypotenuse (longest side).**

| | | | |
|---|---|---|---|
| $a = 3, b = 6, c = ?$ | | $a = 4, b = ?, c = 12$ | |
| $a^2 + b^2 = c^2$ | Pythagorean Theorem | $a^2 + b^2 = c^2$ | Pythagorean Theorem |
| $3^2 + 6^2 = c^2$ | Plug in values | $4^2 + b^2 = 12^2$ | Plug in values |
| $9 + 36 = c^2$ | square numbers | $16 + b^2 = 144$ | square numbers |
| $45 = c^2$ | combine numbers | $b^2 = 120$ | Get all numbers on one side |
| $\sqrt{45} = \sqrt{c^2}$ | square root both sides | $\sqrt{b^2} = \sqrt{120}$ | square root both sides |
| $6.71 = c$ | answer | $b = 10.95$ | answer |

**M. Simplifying Radicals: No perfect squares left under the radical sign.**

Ex: Write in simplest form $\sqrt{8} = \sqrt{\underbrace{4}_{\text{perfect square}} \cdot 2} = \sqrt{4} \cdot \sqrt{2} = 2\sqrt{2}$

**N. Solve literal equations for the given variable**

The process of solving a formula for a given variable is called solving literal equations.

| ***Example #1*** **Solve for *x*:** | ***Steps*** |
|---|---|
| $ax + b = c$ <br> $\quad - b \quad -b$ | 1. Move ***b*** (the opposite of add is subtract) |
| $ax = c - b$ <br> $\frac{ax}{a} = \frac{c-b}{a}$ | 2. Move ***a*** (the opposite of multiply is divide) |
| $x = \frac{c-b}{a}$ | 3. ***x*** is what we are solving for and it stands alone. |