

# Westside Summer Enrichment Packet

## Geometry HADV

### **IMPORTANT INSTRUCTIONS FOR STUDENTS!!!**

We understand that students come to Geometry with different strengths and needs. This packet is to help you prepare for the year to come. Making sure you can show work for each problem and be able to work in problem, will help ensure your success in Geometry Pre-AP

- Students should answer all the questions; **you must show all work.**
- The purpose of this packet is to allow students to show what they know on certain concepts while informing the teacher of concepts that may need to be reviewed with students after school starts.
- Need face-to-face help with packet? Go to tutorials the first week of school.
- Finally, honor and integrity is at the heart of a Westside Wolf! Smart wolves never cheat. You are only hurting yourself by attempting to copy someone else's work. This packet is to help you be ready for Geometry Pre-AP and help your teachers know what you can do.

**Now! Get Ready, Get Set, and Do Your Best!**

**Must Show work to get credit.....**

**Complete problems on a separate sheet of paper to  
turn in.**

**A. 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  $(-9,-7)$

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

4.  $y = 7$                       5.  $x = -4$                       6.  $2x + y = 15$                       7.  $x - 2y = 7$

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

8.  $m = 4$ ;  $(3,2)$                       9.  $m = -2$ ;  $(4,7)$                       10.  $m = -\frac{4}{3}$ ;  $(3,-1)$

**D. Find the equation of the line containing the following points.  
Write answer in standard form.**

11.  $(2,6)$  and  $(4,1)$                       12.  $(3,5)$  and  $(-5,3)$                       13.  $(-2,-3)$  and  $(-4,-6)$

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

14. The line with x-intercept 4 and y-intercept of  $-5$ .

15. The line containing  $(0,3)$  and  $(-2,0)$ .

**F. Write the equation of the line in point-slope form.**

16. The line containing  $(-3,-2)$  and  $(5,2)$ .

17. The horizontal line passing through  $(2,5)$ .

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

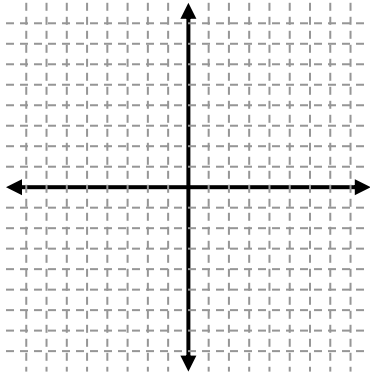
18. The line containing  $(3,1)$  and  $(4,8)$ .

19. The line containing  $(3,3)$  and  $(-6,9)$ .

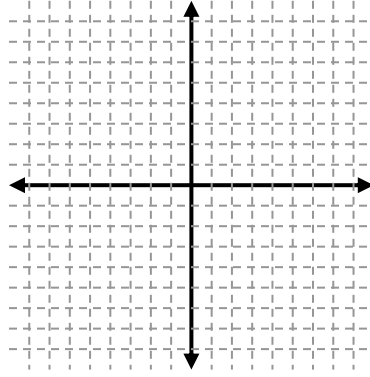
20. The line with slope  $\frac{4}{5}$  and containing  $(-1,7)$ .

Graph the following equations. Graph three points and label the line with its equation.

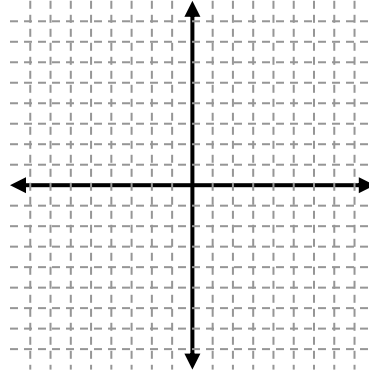
1.  $y - 3 = 2(x - 1)$



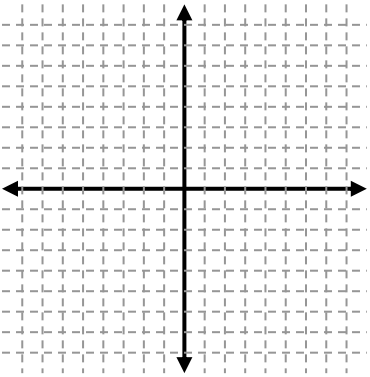
2.  $y - 5 = \frac{2}{3}(x - 2)$



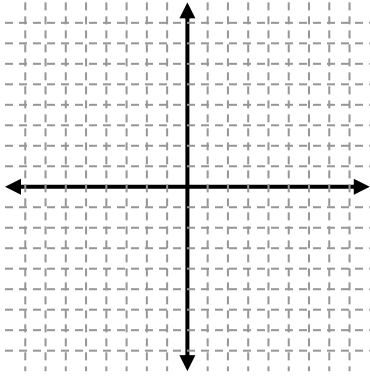
3.  $y - 4 = -3(x - 5)$



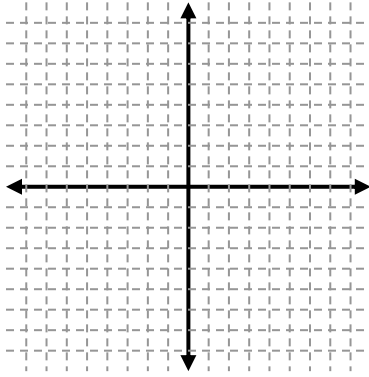
1.  $y = 2x - 3$



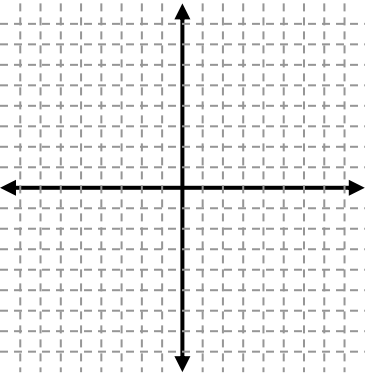
2.  $y = \frac{1}{2}x - 5$



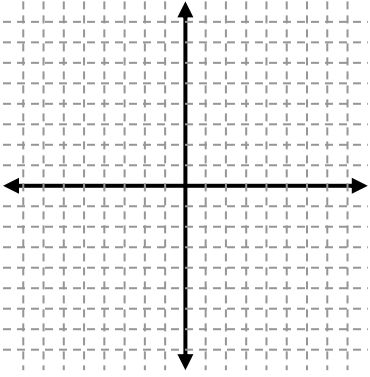
3.  $y = -2x + 3$



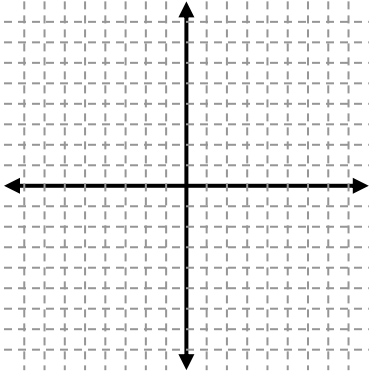
1.  $4x + 2y = 8$



2.  $x - 3y = 6$



3.  $4x + 6y = 12$



**K. Simplify each expression using appropriate Order of Operations. (Don't use a calculator)**

1.  $1 \cdot 5 - 6 \div 2 + 3^2$

2.  $125 \div [5(2 + 3)]$

3.  $4 + 2(10 - 4 \cdot 6)$

4.  $3(2 + 7)^2 \div 5$

5.  $12(20 - 17) - 3 \cdot 6$

6.  $3^2 \div 3 + 2^2 \cdot 7 - 20 \div 5$

**L. Solve for the variable in each problem.**

1.  $5(3x - 2) = 35$

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

3.  $5r - 2(2r + 8) = 16$

4.  $13 - (2c + 2) = 2(c + 2) + 3c$

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

6.  $12 - 3(x - 5) = 21$

**M. Solve each system of linear equations.**

1. 
$$\begin{cases} x = 3y - 4 \\ 2x - y = 7 \end{cases}$$

2. 
$$\begin{cases} 3b + 2a = 2 \\ -2b + a = 8 \end{cases}$$

3. 
$$\begin{cases} r - 2s = 0 \\ 4r - 3s = 15 \end{cases}$$

4. 
$$\begin{cases} y - 2x = 0 \\ 3x + 7y = 17 \end{cases}$$

**N. Multiply the following binomials.**

1.  $(x + 3)(x + 4)$

2.  $(x - 6)^2$

3.  $(6x + 5)(2x - 1)$

**O. Factor each of the following polynomials. (O and Q are 2 different types of problems)**

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

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

3.  $x^2 + x - 42$

4.  $x^2 - 81$

**P. Solve each quadratic equation using the square root property.**

1.  $x^2 = 121$

2.  $3x^2 = 30$

3.  $4x^2 - 25 = 0$

**Q. Solve each quadratic equation using factoring. (This topic is necessary to be successful in Geometry PreAP, quadratics are on almost every test through the year)**

1.  $x^2 + 7x = 0$

2.  $p^2 - 16p + 48 = 0$

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

4.  $m^2 + 4m = 21$

5.  $t^2 = 9t - 14$

6.  $2x^2 + 12x = -10$

7.  $6x^2 + 4x = 5x + 12$

8.  $6x^2 + 24x = 40 - 2x^2 - 12x$

9.  $6x^2 + 29x = 42$

**R. 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. It is better if you can leave as a simplified radical like in Section S. (Simplified radicals will be the type of answers used in Geometry)**

1.  $a = 5, b = 12, c = ?$       2.  $a = 6, b = 3, c = ?$       3.  $a = 5, b = 8, c = ?$       4.  $a = ?, b = 10, c = 11$

**S. Simplify the following radicals (your answer will not be a decimal)**

1.  $\sqrt{18} =$       2.  $\sqrt{24} =$       3.  $\sqrt{27} =$       4.  $\sqrt{32} =$   
 5.  $\sqrt{40} =$       6.  $\sqrt{45} =$       7.  $\sqrt{48} =$       8.  $\sqrt{75} =$

**T Simplify each problem using exponent rules**

1.  $x^3 \cdot x^6 =$  \_\_\_\_\_      2.  $c \cdot c^5 \cdot c^2 =$  \_\_\_\_\_      3.  $x^5 \cdot x^6 \cdot x^7 =$  \_\_\_\_\_  
 4.  $(2a^4)(5a^3) =$  \_\_\_\_\_      5.  $(-2xy^2)(-3x^2y) =$  \_\_\_\_\_      6.  $(3cd^4)(-2c^2)(4cd^2) =$  \_\_\_\_\_  
 7.  $(5a)^2 =$  \_\_\_\_\_      8.  $(-6x)^2 =$  \_\_\_\_\_

**U Solve each equation.**

- 1)  $\frac{c}{6} = -24$       23)  $-\frac{x}{3} = 15$       3)  $\frac{x}{2} + 7 = 1$   
 4)  $\frac{x-2}{3} = 4$       5)  $-3 = \frac{x-1}{5}$       6)  $5t + 3t = -16$   
 7)  $-3 = 7(h-2) + 11$       8)  $10\left(t - \frac{3}{5}\right) = 8$       9)  $\frac{1}{3}y + 3 = \frac{1}{2}y$

**Everything after this is examples on how to work problems and is not part of the assignment.**

## Examples for Summer Packet Westside High School

**A. Slope formula**  $m = \frac{y_2 - y_1}{x_2 - x_1}$       Ex:  $(1, -3)$  and  $(4, 5)$      $m = \frac{5 - (-3)}{4 - 1} = \frac{8}{3}$

**B. Slope intercept formula:**  $y = m x + b$   
slope    y-intercept

Example:  $3x + 4y = 12$   
 $-3x \qquad -3x$   
 $4y = -3x + 12$   
 $4 \quad 4 \quad 4$   
 $y = -\frac{3}{4}x + 3$

Slope is  $-\frac{3}{4}$   
y-intercept is  $(0, 3)$

**Special Cases:**  
Horizontal lines are  $y = \text{a number}$  slope is "0"  
Vertical line  $x = \text{a number}$  slope is "No slope"

**C. Point slope formula:**  $y_2 - y_1 = m(x - x_1)$   
y of ordered pair    slope    x of ordered pair

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 and slope 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

**D. Use examples from A to find slope. Take slope and one of the points and plug into point slope, and use example from C. Once equation is in slope intercept, get x and y on one side and multiply by common denominator of x and y, so that there is not any fractions.**

Example:  $(3, -2)$  and  $(6, 0)$

$m = \frac{0 - (-2)}{6 - 3} = \frac{2}{3}$	$y - (-2) = \frac{2}{3}(x - 3)$	$y = \frac{2}{3}x - 4$
	$y + 2 = \frac{2}{3}x - 2$	$3\left(\frac{2}{3}x - y = -4\right)$
	$-2 \qquad -2$	$2x - 3y = -12$
	$y = \frac{2}{3}x - 4$	

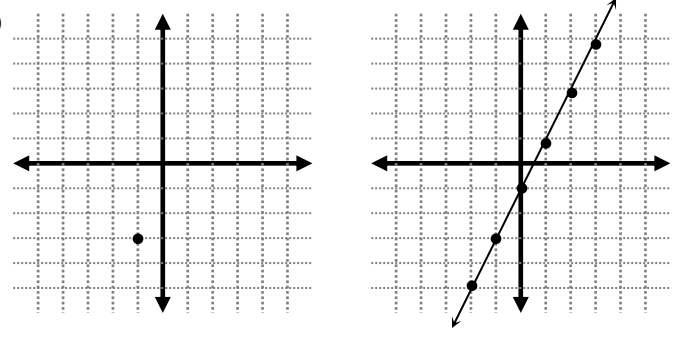
**E. Use information from A,B,C,D to figure out E.**

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

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

**H. Graph from point slope,**  $y - y_1 = m(x - x_1)$

$y - y_1$        $m$        $(x - x_1)$   
 y of      slope      x of  
 ordered           ordered  
 pair           pair

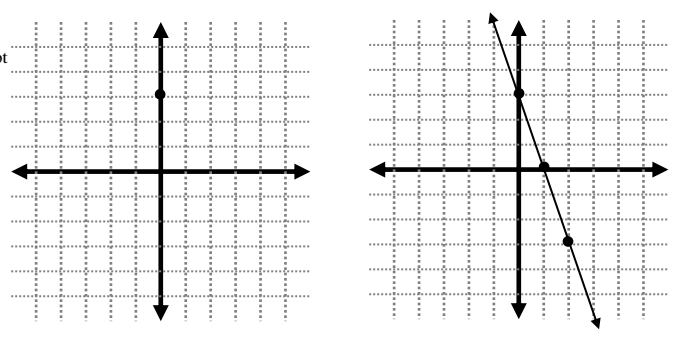


- $y + 3 = 2(x + 1)$  Equation
- $(-1, -3)$   $m = 2$  Pull out point and slope from equation.
- Plot point
- Use slope to plot other points
- Draw line

Slope is  $\frac{\text{rise}}{\text{run}} = \frac{+ = \text{up or } - = \text{down}}{+ = \text{right or } - = \text{left}} = \frac{2}{1} = 2 \text{ up and 1 right}$

**I. Graphing from slope intercept,**  $y = m x + b$

$m$        $b$   
 slope      y-intercept



- $y = -\frac{1}{3}x + 3$  Equation
- $m = -\frac{1}{3}$   $(0, 3)$  Pull out slope and y-intercept
- Graph y-intercept
- Use slope to graph other points

**J. Graphing from standard form,**  $Ax + By = C$

Take equation solve for slope intercept form, then use the steps from I.

**K. PEMDAS = P**arentheses, **E**xponents, **M**ultiplication/**D**ivision, **A**dd/**S**ubtract from left to right

**L. 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. When problems have fractions try clearing the fractions by multiplying by the least common denominator and the problem will be easier to solve.

### M. Solving a system of equations by elimination

$$\begin{array}{r}
 4x - 3y = 25 \xrightarrow{\text{multiply by 3}} 12x - 9y = 75 \\
 -3x + 8y = 10 \xrightarrow{\text{multiply by 4}} -12x + 32y = 40 \\
 \hline
 23y = 115 \\
 y = 5
 \end{array}$$

This is so that the x part of the equation will cancel

$$\begin{array}{r}
 4x - 3(5) = 25 \\
 4x - 15 = 25 \\
 4x = 40 \\
 x = 10
 \end{array}$$

Plug y into one of the equations and solve for the other variable.

(10,5) Write answer as an ordered pair

### N. Multiplying binomials

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

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

### O. Factoring Examples:

1)  $a^2 - b^2 = (a + b)(a - b)$

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

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

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  $3 \cdot -4 = -12$

### P. Square root method

$5x^2 - 75 = 0$  Problem

$\frac{5x^2}{5} = \frac{75}{5}$  Get numbers on one side of equation

$x^2 = 15$

$x^2 = 15$  Divide by 5

$x = \sqrt{15}$  Square root both sides



$(x+6)^2 = 21$	Problem
$\sqrt{(x+6)^2} = \sqrt{21}$	square root both sides
$(x+6) = \sqrt{21}$	square root of $\sqrt{(x+6)^2} = (x+6)$
$-6 \quad -6$	subtract 6 from each side
$x = \sqrt{21} - 6$	answer

Q. Solve using 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"
$-15 \quad -15 \quad +3 \quad +3$	
$a = -15 \quad a = 3$	Answer

R. 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

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

T. Examples:  $x^2 \cdot x^5 = x^{2+5} = x^7$        $c^6 \cdot c^3 = c^{6+3} = c^9$        $a \cdot a^5 = a^{1+5} = a^6$

Examples:  $(2x^3)(4x^4) = (2 \cdot 4)(x^{3+4}) = 8x^7$

Examples:  $(x^2)^4 = (x^2) \cdot (x^2) \cdot (x^2) \cdot (x^2) = (x^{2+2+2+2}) = x^8$

$(u^3)^5 = (u^3) \cdot (u^3) \cdot (u^3) \cdot (u^3) \cdot (u^3) = (u^{3+3+3+3+3}) = u^{15}$

Examples:  $(2x)^4 = (2x)(2x)(2x)(2x) = (2 \cdot 2 \cdot 2 \cdot 2)(x^{1+1+1+1}) = 16x^4$

$(-6k)^3 = (-6k)(-6k)(-6k) = (-6 \cdot -6 \cdot -6)(k^{1+1+1}) = -216k^3$

U. See Section L