Westside

Summer Assignment Packet

Geometry

HISD ADVANCED

Name: ____

Period: __________

IMPORTANT INSTRUCTIONS FOR STUDENTS!

- Be sure to **show all work**, work on a separate sheet of paper, be sure to attach it to this assignment.
- Work should be neat and labeled for each problem.
- This summer assignment is due the 3rd week of school and will be extra credit for a major in the first six weeks of school.

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.

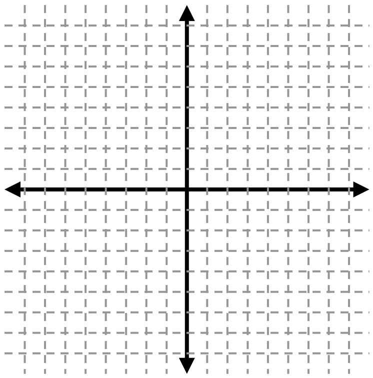
18. The line containing $(3,1)$ and $(4,8)$.

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

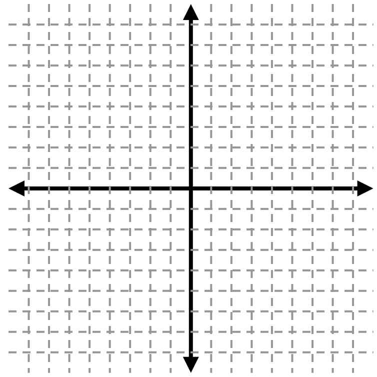
20. The line with slope $\frac{4}{5}$ and containing $(-1,7)$.

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

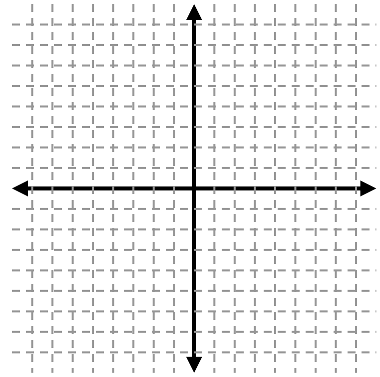
1. $y-3=2(x-1)$



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



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



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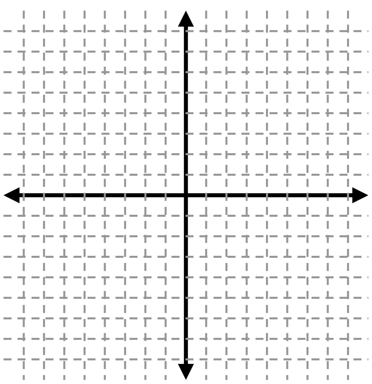
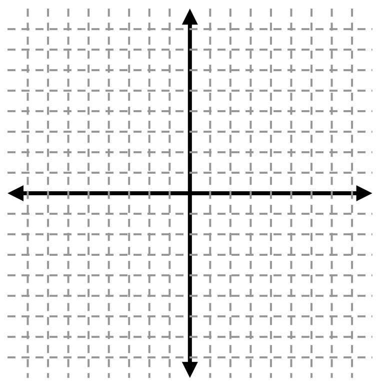
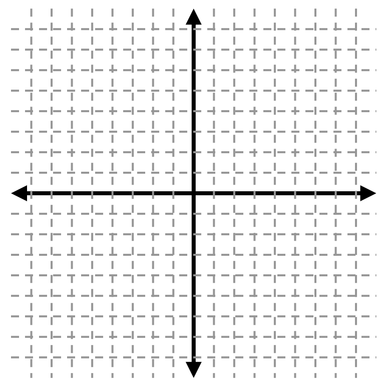
1. $y=2x-3$



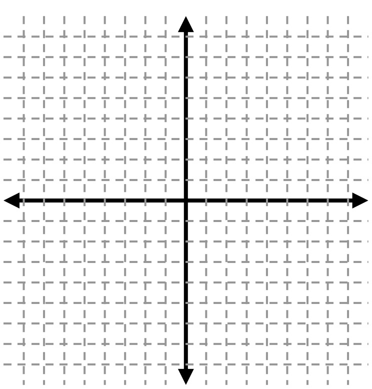
2. $y=\frac{1}{2}x-5$



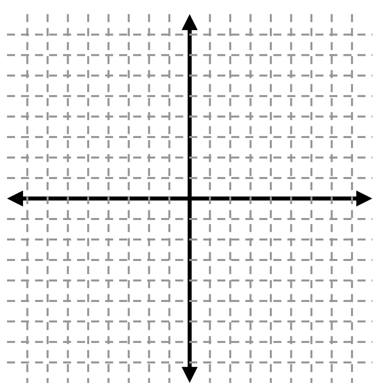
3. $y=-2x+3$



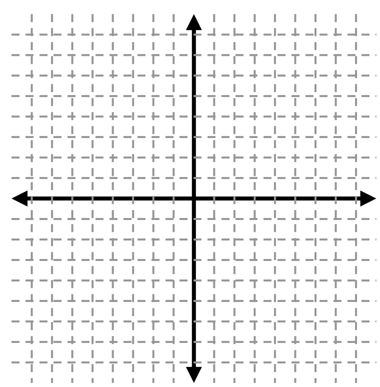
1. $4x+2y=8$



2. $x-3y=6$



3. $4x+6y=12$



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

1. $1 \bullet 5-6\div 2+3^2$
2. $125\div[5(2+3)]$
3. $4+2(10-4\bullet 6)$
4. $3(2+7)^2\div 5$
5. $12(20-17)-3\bullet 6$
6. $3^2\div 3+2^2\bullet 7-20\div 5$

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. $x^3 \bullet x^6$ = ________
2. $c \bullet c^5 \bullet c^2$ = ________
3. $x^5 \bullet x^6 \bullet x^7$ = ________
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: $y = \underset{\text{slope}}{m}\, x + \underset{\text{y-intercept}}{b}$

Example:

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

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: $y - \underset{\text{y of ordered pair}}{y_1} = \underset{\text{slope}}{m}\,(x - \underset{\text{x of ordered pair}}{x_1})$

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 $(6,0)$

$$m = \frac{0-(-2)}{6-3} = \frac{2}{3}$$

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

$$y = \frac{2}{3}x - 4$$
$$3\left(\frac{2}{3}x - y = -4\right)$$
$$2x - 3y = -12$$

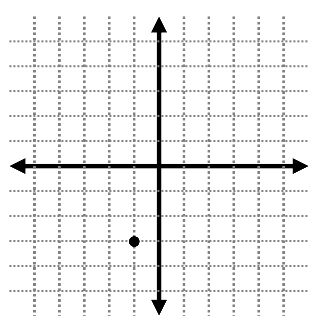
E. Use information from A,B,C,D to figure out E.

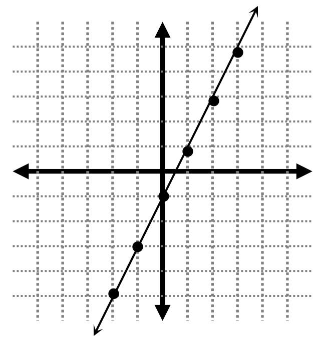
F. Use information from A,B,C,D to figure out F.

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 of ordered pair; slope; x of ordered pair)





$y+3=2(x+1)$ Equation

$(-1,-3)\ \ m=2$ Pull out point and slope from equation.

Plot point

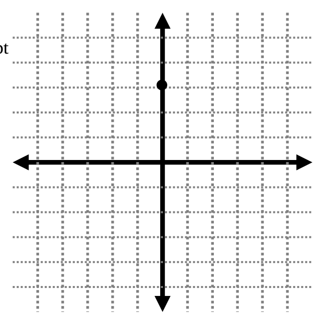
Use slope to plot other points

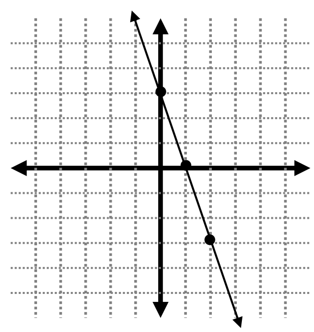
Draw line

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

I. Graphing from slope intercept, $y = mx + b$

(slope; y-intercept)





$y=-\dfrac{1}{3}x+3$ Equation

$m=-\dfrac{1}{3}\ \ (0,3)$ 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

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

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

$$4x-3(5)=25$$
$$4x-15=25$$
$$4x=40$$
$$x=10$$

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

$$(10,5)$$

Write answer as an ordered pair

N. Multiplying binomials

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

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

O. 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 $3\bullet{}^-4={}^-12$

P. Square root method

$5x^2-75=0$ Problem

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

$x^2=15$ 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"

$-15 \; -15 \qquad +3 \; +3$

$a = -15 \qquad a = 3$ 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 $\sqrt{8} = \sqrt{\underbrace{4}_{\text{perfect square}} \bullet 2} = \sqrt{4} \bullet \sqrt{2} = 2\sqrt{2}$

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

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

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

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

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

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

U. See Section L