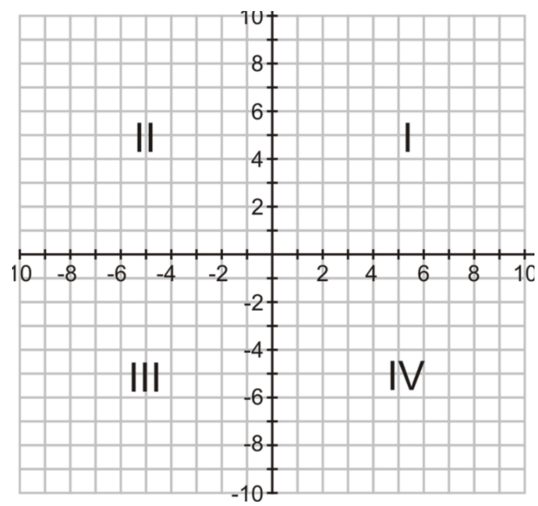
Name: ______________________________ Date: ______________
Geometry Summer Packet Algebra Review and Geometry Vocabulary

Pre-Requisite Algebra Skills

I. Plotting Points on a Coordinate Plane

Recall: coordinates are represented by (x, y) where x shows how many units to move left and right and y shows how many units to move up and down.

Plot the following coordinates on the coordinate plane:
(4, 6), (-1, 3), (5, -2), (-4, -1), (6, 0), and (0, 1)

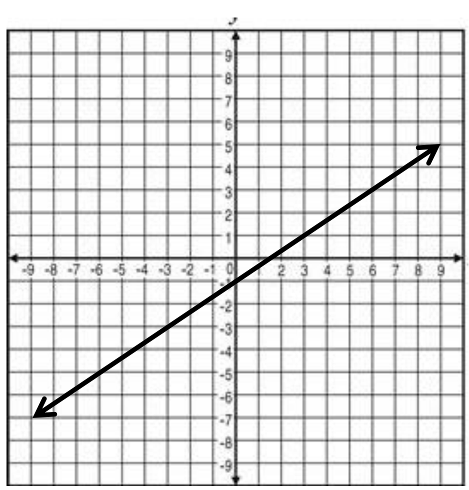


II. Graphing Lines

Recall:

$y = \frac{2}{3}x - 1$ where $\frac{2}{3}$ represents the slope $(\frac{rise}{run})$

and -1 represents the y-intercept (starting point)



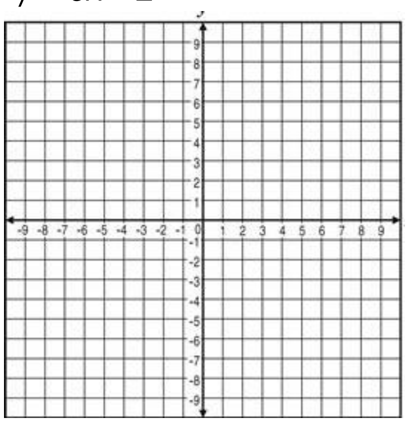
Recall:

Horizontal lines have a slope of zero and equations that look like: y = 3

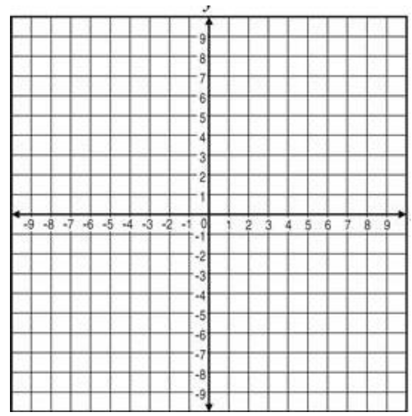
Vertical lines have an undefined slope and equations that look like: x = -4

Graph the following lines:

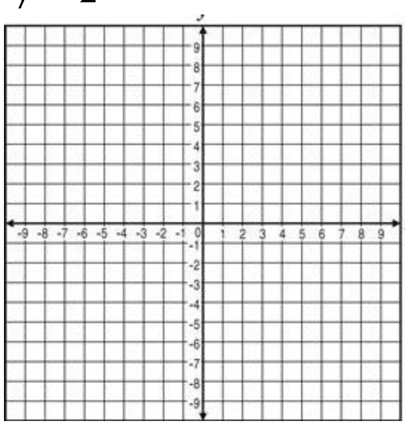
y = 5x – 2



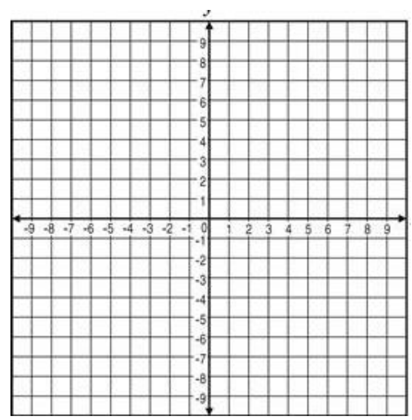
y = -4x



y = -2



x = 1



III. Writing an Equation Given Two Points

Recall: To write an equation in slope-intercept form (y=mx+b) you need the slope (*m*) and the y-intercept (*b*).

Given points (1, 6) and (3, -4)

$\frac{-4-6}{3-1} = \frac{-10}{2} = -5$ calculate slope

6 = -5(1) + b plug in the slope and <u>any</u> point to find b
6 = -5 + b
11 = b

y = -5x + 11 write the equation

note: a line <u>parallel</u> to this line would have a slope of -5 (parallel lines have the same slope)

a line <u>perpendicular</u> to this line would have a slope of $\frac{1}{5}$ (perpendicular lines have opposite reciprocal slopes)

Write the equation of the line given points (1, 3) and (-2, 5):

parallel slope:

perpendicular slope:

Write the equation of the line given points (4, 7) and (-1, -3):

parallel slope: perpendicular slope:

IV. Systems of Equations

Recall:

Substitution is best used when one variable can be easily isolated.

x = -7y – 10
3x + 8y = 9

3(-7y – 10) + 8y = 9 — sub one variable in for the other and solve
-21y – 30 + 8y = 9
13y = 39
y = 3

x = -7(3) – 10 — plug the variable in to solve for the other
x = -21 – 10
x = -31

Elimination is best used when one variable can easily be set up to have opposite coefficients.

3x – 4y = -5
5x – 2y = -6

3x – 4y = -5 — mult. the 2nd equation by -2 to get the y terms to cancel
-10x + 4y = 12

-7x = -7 — add straight down
x = 1

3(1) – 4y = -5 — plug the variable in to solve for the other
3 – 4y = -5
-4y = -8
y = 2

Solve the following systems using substitution or elimination:

2x – 3y = -2	2x + y = 9	-4x + 3y = -2	2x – y = 9
4x + y = 24	3x – y = 16	y = x + 1	3x + 4y = -14

V. Factoring Trinomials

Recall: (always check if you can factor out a GCF first)

AC Method → $\mathbf{6x^2 + 5x - 4 = 0}$ ($ax^2 + bx + c$)

<u>-24</u>
1 24
2 12
(-3 8)
4 6

Multiply a and c. Find factors of ac that add up to b.

Replace middle term with chosen factors.

$6x^2 - 3x + 8x - 4 = 0$

Factor by grouping.

$3x(2x - 1) + 4(2x - 1) = 0$
$(2x - 1)(3x + 4) = 0$

Set each factor equal to 0 and solve.

$2x - 1 = 0$ so $x = \frac{1}{2}$ $3x + 4 = 0$ so $x = \frac{-4}{3}$

Shortcut when a = 1

$\mathbf{x^2 - 5x - 14 = 0}$

Find factors of c that add up to b.

<u>-14</u>
1 14
(2 -7)

$(x + 2)(x - 7) = 0$

$x = -2, x = 7$

Solve the following equations by factoring:

$3x^2 - 14x - 5 = 0$

$6x^2 - 5x = 4$

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

$x^2 - 5x + 6 = 0$

VI. Solving Equations

Recall:

- Check for distribution.
- Move all terms with the variable to one side.
- Combine like terms.
- Isolate the variable by undoing addition and subtraction then multiplication and division (opposite operation on the other side)

Solve:

$5(x + 3) + 9 = 3(x - 4) + 6$

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

$4b + 5 = 1 + 5b$

VII. Simplifying Radicals

$\sqrt{75}$ $\sqrt{32}$ $\sqrt{144}$

Recall:

* Know your perfect squares!

* Not a perfect square? Break down into factors that include a perfect square.

$\sqrt{20}$

$\sqrt{4}\sqrt{5}$

$\boxed{2\sqrt{5}}$

VIII. Fraction Work → ALWAYS SIMPLIFY

Recall:

Multiplication (straight across) $\frac{2}{3} \bullet \frac{4}{5} = \frac{8}{15}$

Division (multiply by reciprocal) $\frac{4}{3} \div \frac{2}{5} = \frac{4}{3} \bullet \frac{5}{2} = \frac{20}{6} = \frac{5}{3}$

Addition and Subtraction $\frac{2}{3} + \frac{4}{5} = \frac{10}{15} + \frac{12}{15} = \frac{22}{15}$

(find common denominator)

$\frac{4}{3} \bullet \frac{2}{7}$ $6 \div \frac{3}{4}$

$\frac{2}{5} + \frac{3}{4}$ $\frac{7}{3} - \frac{2}{9}$