Linear Equations. Representations. Name _____

Difference between an **equation** and an **expression**: An **equation** has an "=" sign; an **expression** doesn't.

Definitions: [we can use #0 or #1 below as our definition of a line.] NOTE: a vertical line is a line, but not a linear function. The equation of a vertical line is "x=a" where "a" is any constant value.

0. A Linear equation is an equation whose graph is a (non-vertical) line.
1. [STANDARD FORM] A Linear equation is an equation of the form $Ax + By + C = 0$. (a linear polynomial in 2 variables is equal to zero). Note that either A or B must be non-zero.
2. [SLOPE-INTERCEPT FORM] A linear equation is an equation of the form $y = mx + b$, where m = slope and b = y-intercept.
3. [TWO-INTERCEPT FORM] A linear equation is an equation of the form $x/a + y/b = 1$, where a = x-intercept and b = y-intercept. (WATCH OUT: lines through the origin cannot be put into this form !!!)
4. [POINT-SLOPE FORM] A linear equation is an equation of the form $(y-y_1) / (x-x_1) = m$, where (x_1,y_1) is a point through which the line passes, and m = the slope of the line.
5. [TWO-POINT FORM] A linear equation is an equation of the form $(y-y_1) / (x-x_1) = (y_2-y_1) / (x_2-x_1)$ where (x_1,y_1) and (x_2,y_2) are different points through which the line passes.

Steps in graphing equations of each form: (draw the line after the steps below.)

1. [STANDARD FORM] $Ax + By + C = 0$
    a. Set x=0 and solve for y. This gives a point on the y-axis.
    b. Set y=0 and solve for x. This gives a point on the x-axis..
2. [SLOPE-INTERCEPT FORM] $y = mx + b$
    a. Find the point (0,b) on the graph.
    b. Use the slope m = [rise/run] to find a second point.
3. [TWO-INTERCEPT FORM] $x/a + y/b = 1$
    a. Graph the points (a,0) and (0,b).
4. [POINT-SLOPE FORM] $(y-y_1) / (x-x_1) = m$
    a. Graph the point (x_1,y_1).
    b. Use the slope m =to find a second point relative to the first point.
5. [TWO-POINT FORM] $(y-y_1) / (x-x_1) = (y_2-y_1) / (x_2-x_1)$
    a. Graph the points (x_1,y_1) and (x_2,y_2).

	Assignment I. Graph all of these on the same graph			Assignment 2. Graph all of these on the same graph.
A	y = 2x+ 3		M	y = 5x – 2
B	y = 2x + 5		N	y = 3x – 2
C	y = 2x – 6		P	y = x – 2
D	y = 2x		Q	y = (2/3)x – 2
E	y = 2x – 1		R	y = (1/5)x – 2
F	y = 2x + ½		S	y = (-1/2)x – 2
G	y = 2x – 1/3		T	y = -(3/2)x – 2
H	y = 2x + 7/2		U	y = -4x – 2
J	y = 2x + 2		V	y = -9x - 2