

Linear Equations
Writing equations of lines

STANDARD FORM

$$Ax + By = C$$

Where A, B, and C are real numbers and A and B are not both zero.
Standard form cannot have any fractions!

POINT-SLOPE FORM

The line through point (x_1, y_1) with slope m has the equation below.

$$y - y_1 = m(x - x_1)$$

Writing an equation given the slope and a point

Example 1: Write in standard form the equation of a line with slope 2, through (4,-2).

Writing an equation given two points

Example 2: Write in point-slope form the equation of a line through (5,0) and (-3, 2)

Equations of a Line		
<u>Point-Slope Form</u>	<u>Standard Form</u>	<u>Slope-Intercept Form</u>
$y - 2 = -3(x + 4)$	$3x + y = -10$	$y = -3x - 10$

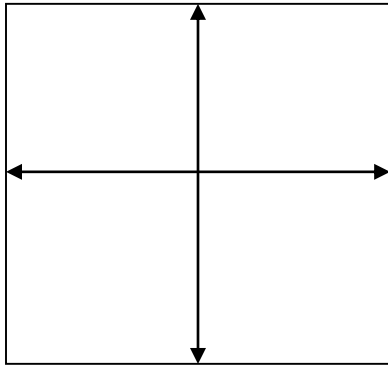
Example 3: Write the following equations in all three forms.

a) through (0,1) and (3,0)

b) slope = $\frac{2}{5}$; through (-1,3)

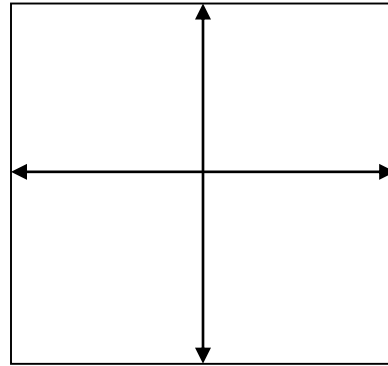
c) slope = -9 ; y-intercept = 7

Horizontal Line



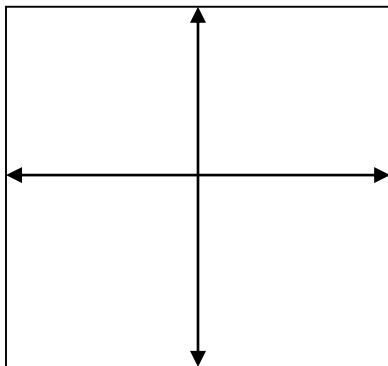
$m=0$
 y is constant

Vertical Line



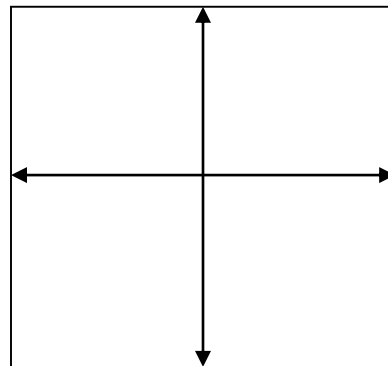
m is undefined
 x is constant

Perpendicular Lines



$m_1(m_2) = -1$
(In other words, m_2 is the
negative reciprocal of m_1)

Parallel Lines



$m = m$
 $b_1 \neq b_2$

Writing equations of parallel and perpendicular lines.

Example 4

Write an equation of a line through (5,2) and parallel to $y = -5x + 4$.

Write an equation of a line through (6,1) that is perpendicular to $y = \frac{3}{4}x + 2$.

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