

Section 1.4 Writing Linear Equations

Linear equations take two primary forms:

a) slope-intercept form $y = mx + b$

b) standard form $Ax + By = C$

m is the slope

b is the y -intercept $(0, b)$

The coefficient of x and y can be used to solve for the slope of the line.

$$-\frac{A}{B} = m$$

Ex $y = 3x - 4$ $m = 3$, y -intercept = $(0, -4)$

Ex $3x + 5y = 2$ $m = -\frac{3}{5}$

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

If a slope of a line and a point on the line are known, the equation of the line can be determined using the point-slope method.

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

Ex. Given $m = 2$ and $(3, 1)$ Find the equation of the line with these values.
 $x_1 = 3$, $y_1 = 1$, $m = 2$

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

$$y - 1 = 2x - 6$$

$$y = 2x - 6 + 1$$

$$y = 2x - 5$$

The slope-intercept form of this line will be $y = 2x - 5$

This equation can also be written in standard form as: $5 = 2x - y$ which becomes $2x - y = 5$

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#12 slope = 8 passes through $(-7, 5)$

$$y - 5 = 8(x - -7)$$

$$y - 5 = 8(x + 7)$$

$$y - 5 = 8x + 56$$

$$y = 8x + 61$$

#17 passes through $A(1, 5)$ and $B(-8, 9)$

$$m = \frac{9 - 5}{-8 - 1} = \frac{4}{-9} = -\frac{4}{9}$$

$$y - 5 = -\frac{4}{9}(x - 1)$$

$$y - 5 = -\frac{4}{9}x + \frac{4}{9}$$

$$y = -\frac{4}{9}x + \frac{4}{9} + 5$$

$$y = -\frac{4}{9}x + 5\frac{4}{9}$$

#18 x-intercept = -8 y-intercept = 5

$(-8, 0)$ $(0, 5)$

$$m = \frac{5 - 0}{0 - -8} = \frac{5}{8}$$

$$y - 5 = \frac{5}{8}(x - 0)$$

$$y - 5 = \frac{5}{8}x$$

$$y = \frac{5}{8}x + 5$$