

3.3 EQUATIONS OF LINES IN SLOPE INTERCEPT FORM

$$y = mx + b$$

m IS THE SLOPE OF THE LINE.

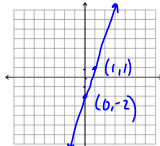
b IS THE y -INTERCEPT.

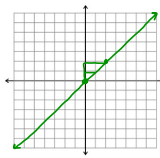
$$m = \frac{\text{RISE}}{\text{RUN}} = \frac{\Delta y}{\Delta x} = \frac{y_1 - y_2}{x_1 - x_2} \quad \text{GIVEN } (x_1, y_1) \text{ AND } (x_2, y_2) \text{ POINTS ON THE LINE}$$

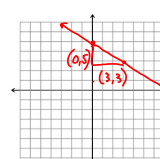
b IS WHERE THE LINE CROSSES THE y -AXIS.
 $(0, b)$ IS A POINT ON THE LINE.

Feb 14-5:25 PM

Ex. 1

(a)  $b = -2$
 $m = 3$
 $y = 3x - 2$

(b)  $b = 0$
 $m = 1$
 $y = x$

(c)  $b = 5$
 $m = -\frac{2}{3}$
 $y = -\frac{2}{3}x + 5$

Feb 14-5:37 PM

Ex. 2 STANDARD FORM \rightarrow SLOPE INTERCEPT

$$\begin{aligned} 3x - 2y &= 6 \\ -3x & \quad -3x \\ \hline -2y &= -3x + 6 \\ -2 & \quad -2 \\ \hline y &= \frac{3}{2}x - 3 \end{aligned}$$

Feb 14-5:45 PM

Ex. 3 S.I. \rightarrow S.F.

$$\begin{aligned} 5 \left(y = \frac{2}{5}x + 3 \right) \\ 5y &= 2x + 15 \\ -2x & \quad -2x \\ \hline -2x + 5y &= 15 \\ 2x - 5y &= -15 \end{aligned}$$

$$\begin{aligned} Ax + By &= C \\ A \neq 0 \text{ OR } B \neq 0 \\ \text{GCF}(A, B, C) &= 1 \end{aligned}$$

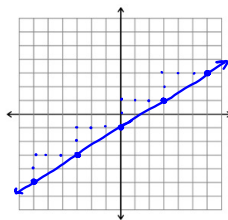
STANDARD FORM

$$\begin{aligned} A, B, C &\in \mathbb{Z} \\ A &\geq 0 \end{aligned}$$

Feb 14-5:49 PM

Ex. 4

graph $2x - 3y = 3$
 SOLVE FOR y . $-3y = -2x + 3$
 $y = \frac{2}{3}x - 1$

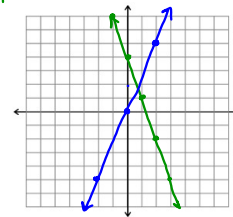


GRAPH YOUR y -INTERCEPT
 GO UP THE RISE
 AND OVER THE RUN
 TO GRAPH THE NEXT POINT

Feb 14-5:53 PM

Ex. 5

(a) $y = -\frac{3}{1}x + 4$ (b) $2y - 5x = 0$
 $2y = 5x$
 $y = \frac{5}{2}x$



Feb 14-5:57 PM

Ex. 6

Ⓐ THROUGH (0,3) // $y = 2x - 1$
 $y = 2x + 3$ PARALLEL LINES HAVE THE SAME SLOPE.

Ⓑ THROUGH (0,4) \perp $2x - 4y = 1$
 $-4y = -2x + 1$
 $y = -\frac{1}{2}x + \frac{1}{4}$
 $y = -2x + 4$
 PERPENDICULAR LINES HAVE OPPOSITE RECIPROCAL SLOPES.

Feb 14-6:07 PM

3.4 POINT SLOPE FORM

$y - y_1 = m(x - x_1)$ LINE WITH SLOPE m THROUGH (x_1, y_1)

$y = mx + b$ LINE WITH SLOPE m THROUGH $(0, b)$

Feb 14-6:15 PM

Ex. 1

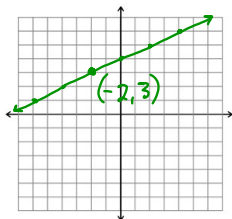
THROUGH $(-2, 3)$ WITH $m = \frac{1}{2}$
 (x_1, y_1)

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

$y - 3 = \frac{1}{2}(x + 2)$

$y - 3 = \frac{1}{2}x + 1$

$y = \frac{1}{2}x + 4$



Feb 14-6:17 PM

Ex. 2

THROUGH $(-3, -2)$ & $(4, -1)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 + 1}{-3 - 4} = \frac{-1}{-7} = \frac{1}{7}$

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

$y - 2 = \frac{1}{7}(x - -3)$

$y - 2 = \frac{1}{7}x + \frac{3}{7}$

$7(y - 2) = x + 3$

$7y - 14 = x + 3$

$-x + 7y = 17$

$x - 7y = -17$

Feb 14-6:21 PM

Ex. 3

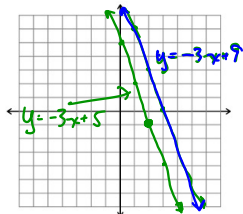
Ⓐ THROUGH $(2, -1)$ // $y = -3x + 9$
 $m = -3$

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

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

$y + 1 = -3x + 6$

$y = -3x + 5$



Feb 14-6:27 PM

THROUGH $(3, 4)$ // $2x - 3y = 6$

$-3y = -2x + 6$

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

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

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

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

$+4$ $+4$

$y = \frac{2}{3}x + 2$

Feb 14-6:32 PM

Ex. 4

THROUGH $(1, -3) \perp 3x + 2y = 8$

$$m = \frac{2}{3}$$

$$2y = -3x + 8$$

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

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

$$y - 3 = \frac{2}{3}(x - 1)$$

$$y = \frac{2}{3}x - \frac{11}{3}$$

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

$$-3 \quad -\frac{9}{3}$$

$$y = \frac{2}{3}x - \frac{11}{3}$$

Feb 14-6:38 PM