6.6 General Form of the Equation for a Linear Relation

$Ax + By = C$ is in standard form

$Ax + By + C = 0$ is the general form

where A is a whole number, B and C are integers

Example: The equation $3x + y - 9 = 0$ defines a line.

a) Determine the x-intercept.
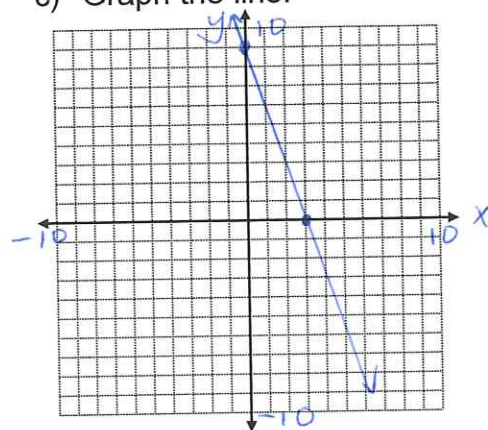
let $y = 0$

$3x - 9 = 0$
$3x = 9$
$x = 3$

$(3, 0)$

c) Graph the line.

b) Determine the y-intercept.

let $x = 0$

$y - 9 = 0$
$y = 9$

$(0, 9)$

Example: Given the equation $5x - 2y - 10 = 0$
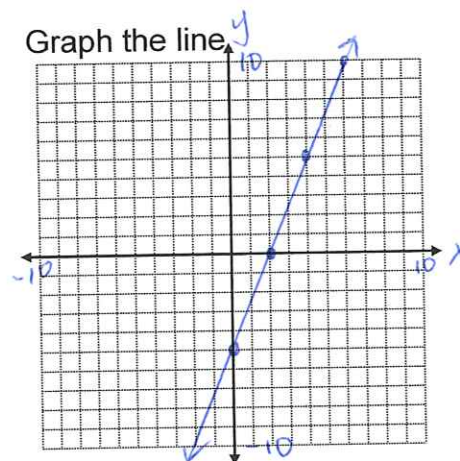
a) Determine the slope and the y-intercept.

$5x - 2y - 10 = 0$

$2y = 5x - 10$

$y = \frac{5x}{2} - 5$

slope: $5/2$ y-int: $(0, -5)$

b) Graph the line

Special Cases of the Equation

$Ax + By + C = 0$: If A, B, or C is zero, there are special properties.

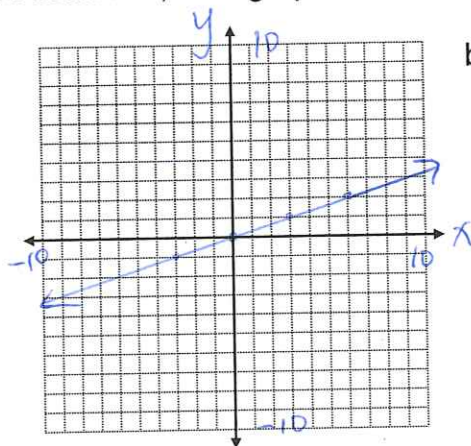**Example:** Describe each line, then graph it.

a) $x - 3y = 0$

$3y = x$
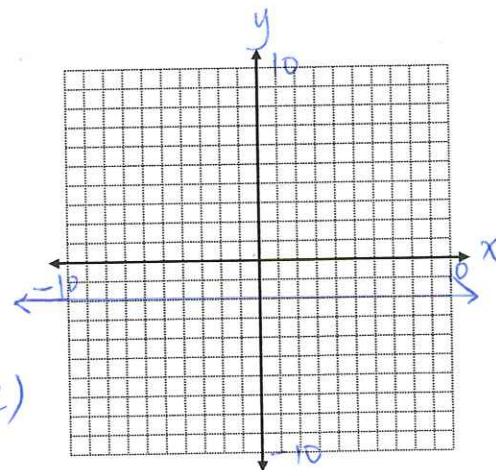
$y = \frac{1}{3}x$

slope: $\frac{1}{3}$

yint $(0, 0)$

b) $2y + 4 = 0$

$2y = -4$
$y = -2$

slope: 0

y-int:

$(0, -2)$
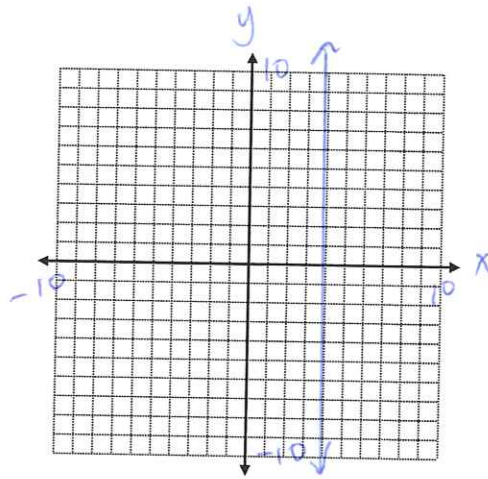
c) $3x - 12 = 0$

$3x = 12$

$x = 4$

slope : undefined

y-int : none

Example: Graph each linear function on the same grid.
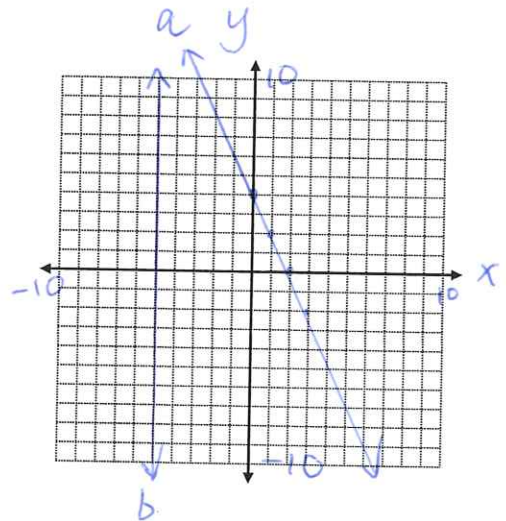
a) $2x + y = 4$

$y = -2x + 4$

b) $5x + 25 = 0$

$5x = -25$

$x = -5$

Example: Write each equation in **general form**.

a) $y = -\dfrac{2}{5}x + 3$

$5y = -2x + 15$

$2x + 5y - 15 = 0$

b) $y - 1 = \dfrac{3}{2}(x + 4)$

$2y - 2 = 3(x + 4)$

$2y - 2 = 3x + 12$

$0 = 3x - 2y + 14$

$3x - 2y + 14 = 0$

c) $y + 4 = -\dfrac{1}{3}(x - 8)$

$-3y - 12 = x - 8$

$0 = x + 3y + 4$

$x + 3y + 4 = 0$

d) $\dfrac{x}{3} + \dfrac{y}{4} = 1$

$4x + 3y = 12$

$4x + 3y - 12 = 0$