The x and y intercepts of a line are the points at which the line crosses the x and y axes, respectively. These points are of the form $(a,0)$ and $(0,b)$, but they are usually represented simply by a and b, since the 0's are understood by their position on the axes. It might be noted that that lines parallel to the x-axis have no x intercept and those parallel to the y-axis have no y intercept.

Slope–Intercept Form of a line with slope m and y intercept b or $(0,b)$ has the equation:

$$y = mx + b$$

Intercept Form of a line with nonzero intercepts a and b or $(a,0)$ and $(0,b)$ has the equation:

$$\frac{x}{a} + \frac{y}{b} = 1$$

General Form of a line where integers A and B are not both zero has the equation: $Ax + By + C = 0$

Standard Form of a line where integers A and B are not both zero has the equation: $Ax + By = C$

Guided Practice

2/102 $m = -1,\ b = 3$ the slope and y intercept implies using the slope–intercept form

$y = mx + b$

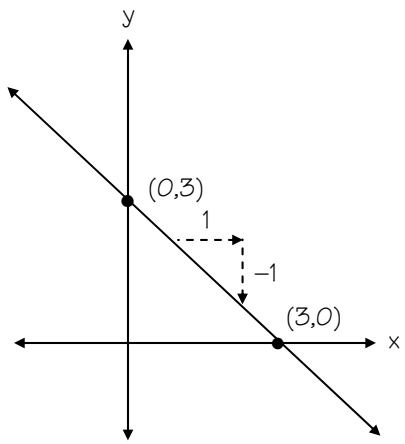
$y = (-1)x + (3)$

$y = -x + 3$ slope–intercept form

$x + y = 3$ standard form

$x + y - 3 = 0$ general form

$\frac{x}{3} + \frac{y}{3} = 1$ intercept form



Guided Practice

8/102 $m = 6,\ a = 3$ the slope and x intercept implies using the point – slope form

$m = 6,\ (3,0)$

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

$y = 6(x - 3) + 0$

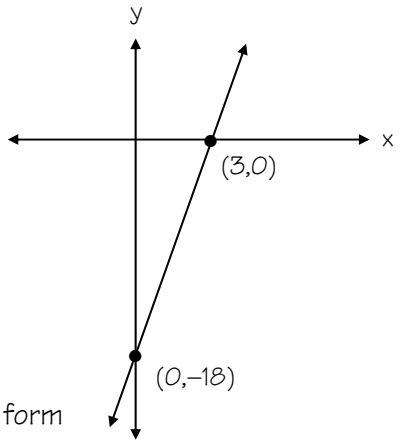
$y = 6x - 18 + 0$

$\boxed{y = 6x - 18}$ slope – intercept form

$18 = 6x - y$

$\boxed{6x - y = 18}$ standard form

$\boxed{6x - y - 18 = 0}$ general form $\boxed{\frac{x}{3} + \frac{y}{-18} = 1}$ intercept form

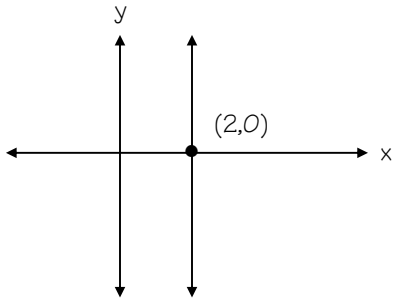


10/102 no m, $a = 2$ no slope and x intercept implies vertical line $x = a$

$m = \text{DNE},\ (2,0)$

$\boxed{x = 2}$

$\boxed{x - 2 = 0}$ general form



18/102 $a = b = 0$, through $(-2,-3)$ two points implies using the two – point form

$a = 0$ and $b = 0$ implies origin $(0,0)$ intercepts

$y = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1) + y_1$

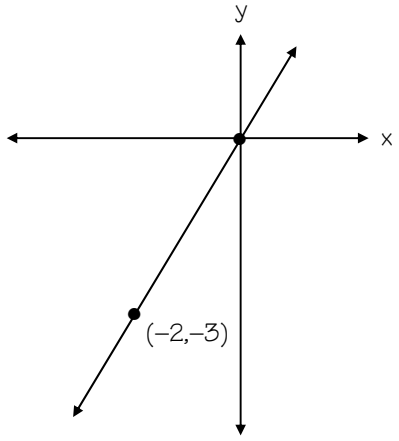
$y = \frac{-3 - 0}{-2 - 0}(x - 0) + 0$

$\boxed{y = \frac{3}{2}x - 0}$ slope – intercept form

$2y = 3x$

$\boxed{3x - 2y = 0}$ standard form

$\boxed{3x - 2y + 0 = 0}$ general form



Independent Practice Page 102 #1-15 odd

Guided Practice

22/102 perpendicular to $x+2y-5=0$ and containing the point (4,1)

$x+2y-5=0$

$2y=-x+5$

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

$y=-\dfrac{1}{2}x+\dfrac{5}{2}$

$m=-\dfrac{1}{2}$

$m_{\perp}=2$ and $(4,1)$

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

$y=2(x-4)+1$

$y=2x-8+1$

$y=2x-7$

$\boxed{y=2x-7}$ slope – intercept form

$2x-7=y$

$\boxed{2x-y=7}$ standard form

$\boxed{2x-y-7=0}$ general form

24/102 $a=3b\neq 0$, through $(5,-4)$ | a and $b\neq 0$ implies using the intercept form

substitute

$x=5,\quad y=-4,\quad a=3b$

$\dfrac{x}{a}+\dfrac{y}{b}=1$

$\dfrac{5}{3b}+\dfrac{-4}{b}=1$

$3b\left[\dfrac{5}{3b}+\dfrac{-4}{b}\right]=3b[1]$

$5+3(-4)=3b$

$5-12=3b$

$-7=3b$

$b=-\dfrac{7}{3}$

$y-\text{intercept}=\left(0,-\dfrac{7}{3}\right)$

$a=3b$

$a=3\left(-\dfrac{7}{3}\right)$

$a=-7$

$x-\text{intercept}=(-7,0)$

substitute

$a=-7,\quad b=-\dfrac{7}{3}$

$\dfrac{x}{a}+\dfrac{y}{b}=1$

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

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

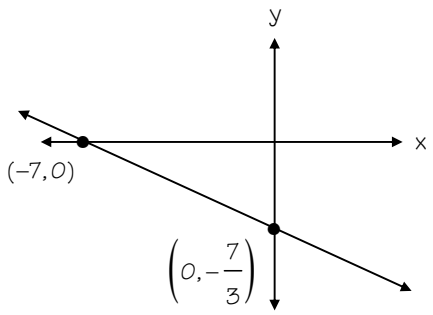
$\dfrac{x}{-7}+\left(\dfrac{y}{1}\right)\left(-\dfrac{3}{7}\right)=1$

$\dfrac{x}{-7}-\dfrac{3y}{7}=1$

$-7\left[-\dfrac{x}{7}-\dfrac{3y}{7}\right]=-7[1]$

$x+3y=-7$

$\boxed{x+3y+7=0}$ general form



$\boxed{\dfrac{x}{-7}+\dfrac{y}{-\frac{7}{3}}=1}$ intercept form

Independent Practice Page 102 #17-27 odd