Lesson 7-6

Example 1

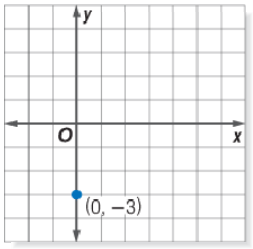
Find the slope and *y*-intercept of $y = \frac{2}{3}x - 3$. Then graph the line.

Solution

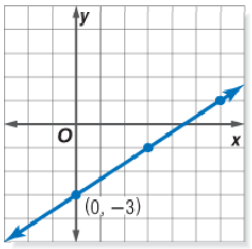
$y = mx + b$ slope-intercept form

$y = \frac{2}{3}x - 3$ The slope is m, or $\frac{2}{3}$ The y-intercept is b, or -3.

Plot the y-intercept at $(0, -3)$.

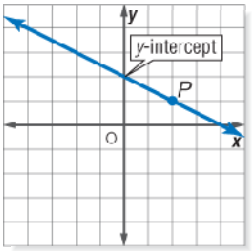


Use the slope to count rise and run units. Locate two more points. Draw a line through the points.



Example 2

Write an equation of the line shown.



Solution

The line intersects the y-axis at $(0, 2)$, so the y-intercept is 2. Therefore, $b = 2$.

Find the slope by counting rise and run units from the y-intercept to point P.

$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{-1}{2} = -\frac{1}{2}$

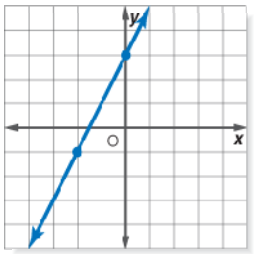
The slope is $-\frac{1}{2}$, Therefore, $m = -\frac{1}{2}$.

The equation of the line is $y = -\frac{1}{2}x + 2$ Slope-intercept form: $y = mx + b$

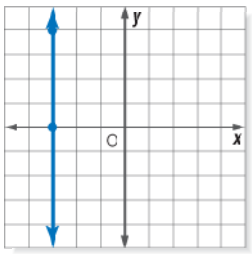
Example 3

Name the slope and *y*-intercept of each line. Write an equation of the line in slope-intercept form.

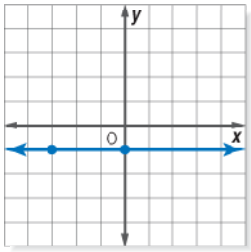
a.



b.



c.



Solution

a. The line intersects the *y*-axis at (0, 3), so the *y*-intercept is 3. Select points (0, 3) and (–2, –1) to find the slope. slope $= \frac{3 - (-1)}{0 - (-2)} = \frac{4}{2} = 2$

The equation of the line is $y = 2x + 3$.

b. The line does not intersect the *y*-axis, so it does not have a *y*-intercept. Select points (–3, 0) and (–3, 4) to find the slope. slope $= \frac{0 - 4}{-3 - (-3)} = \frac{-4}{0}$

The slope is undefined. The equation of any vertical line is the *x*-coordinate of any point on the line. The value –3 is the *x*-coordinate of all points on the line. So the equation of the line is $x = -3$.

c. The line intersects the *y*-axis at (0, –1), so the *y*-intercept is –1. Select points (–3, –1) and (0, –1) to find the slope. slope $= \frac{-1 - (-1)}{-3 - 0} = \frac{0}{-3} = 0$

The equation of the line is $y = 0x - 1$ or $y = -1$. Notice that the value –1 is the *y*-coordinate of all points on the line.