Exercise 42

In Exercises 41–58, find any intercepts and test for symmetry. Then sketch the graph of the equation.

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

Solution

To find the y-intercept, plug $x = 0$ into the function.

$$y = \frac{2}{3}(0) + 1 = 1$$

Therefore, the y-intercept is $(0, 1)$. To find the x-intercept(s), set $y = 0$ and solve the equation for x.

$$\frac{2}{3}x + 1 = 0$$

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

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

Therefore, the x-intercept is $\left(-\frac{3}{2}, 0\right)$. Replacing x with $-x$ changes the equation, so there's no symmetry with respect to the y-axis.

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

Replacing y with $-y$ changes the equation, so there's no symmetry with respect to the x-axis.

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

Replacing x with $-x$ and y with $-y$ changes the equation, so there's no symmetry with respect to the origin.

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

A graph of the function versus x is shown below.