Exercise 44

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

$$y = 2x^2 + x$$

Solution

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

$$y = 2(0)^2 + (0) = 0$$

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

$$2x^2 + x = 0$$

$$x(2x + 1) = 0$$

$$x = \left\{-\frac{1}{2}, 0\right\}$$

Therefore, the x-intercepts are $\left(-\frac{1}{2}, 0\right)$ and $(0, 0)$. Replacing x with $-x$ changes the equation, so there's no symmetry with respect to the y-axis.

$$y = 2(-x)^2 + (-x) = 2x^2 - x$$

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

$$-y = 2x^2 + x \quad \rightarrow \quad y = -2x^2 - x$$

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

$$-y = 2(-x)^2 + (-x) = 2x^2 - x \quad \rightarrow \quad y = -2x^2 + x$$

A graph of the function versus x is shown below.