Quadratic Graphs and the Quadratic Formula

Given the quadratic formula \( x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \), we can find the x-intercepts of quadratic equations that would otherwise be close to impossible to find by factoring alone. For example, examine the equation \( 0 = x^2 + 4x + 2 \). Using the quadratic formula, we get the following:

\[
x = \frac{-4 \pm \sqrt{16 - 8}}{2(1)} = \frac{-4 \pm \sqrt{8}}{2} = -4 \pm \sqrt{8}
\]

We’ll estimate the value of \( \sqrt{8} \) as approximately 2.828, so

\[
x \approx \frac{-4 \pm 2.828}{2} \text{ therefore }
\]

\[
x \approx \frac{-4 + 2.828}{2} = -0.586 \text{ or } x \approx \frac{-4 - 2.828}{2} = -3.414
\]

Find the x- and y-intercepts of the following quadratic equations. Check your answer on MathGV.

1. \( y = 2x^2 - 3x - 5 \)
2. \( y = -x^2 + 3x + 6 \)
3. \( y = 4x^2 + 2x - 3 \)
4. \( y = -5x^2 - 3x + 1 \)