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# Quadratic Equation

Using MATLAB, write two functions that return the two solutions to the quadratic equation $ax^2 + bx + c = 0$. Use something like

function [p, q] = quadratic_formula(a, b, c)

For the first function, assign

$$p = \frac{-b + \sqrt{b^2 - 4ac}}{2a}, \quad q = \frac{-b - \sqrt{b^2 - 4ac}}{2a}.$$

Make sure the code works for some trial values of $a$, $b$, and $c$. Then try your code for $a = 1$, $b = -10^{12}$, $c = 1$. Note that $q = 0$, which is obviously not a correct root. This is an example of round-off error.

For the second function, assign

$$p = \frac{-b + \sqrt{b^2 - 4ac}}{2a}, \quad q = \frac{2c}{-b + \sqrt{b^2 - 4ac}} \qquad (b < 0),$$

and

$$p = \frac{2c}{-b - \sqrt{b^2 - 4ac}}, \quad q = \frac{-b - \sqrt{b^2 - 4ac}}{2a}, \qquad (b \geq 0).$$

Again, make sure the code works for some trial values of $a$, $b$, and $c$. Now try this code for $a = 1$, $b = -10^{12}$, $c = 1$ to obtain more reasonable results.

✓ **Completed**

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