

Answer on Question #85473 – Math – Algebra

Question

There are many advantages to using the quadratic formula to solve for both values of an equation. It always solves quadratic equations for example if you have it memorized. But it has advantages too. What is one disadvantage to using quadratic formula, and what is your opinion about how hard it is to use?

Solution

We can find a single or both roots of the quadratic equation using well-known formula:

$$ax^2 + bx + c = 0, a \neq 0;$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

This is a universal formula for solving quadratics, but in some cases, they can be solved easily:

1) Incomplete quadratic equation:

a) $c = 0$;

$$ax^2 + bx = 0;$$

$$ax(x + b/a) = 0;$$

$$x = 0 \text{ or } x = -b/a.$$

b) $b = 0$;

$$ax^2 + c = 0;$$

$$ax^2 = -c;$$

$$x^2 = -c/a;$$

$$x = \pm \sqrt{-c/a} \quad \left(\text{if } \frac{c}{a} < 0 \right).$$

2) Roots of the reduced quadratic equation ($a = 1$) may be found simply by the Vieta theorem:

$$x^2 + bx + c = 0;$$

$$\begin{cases} x_1 + x_2 = -b; \\ x_1 * x_2 = c. \end{cases}$$

For example:

$$x^2 - 10x + 21 = 0; \begin{cases} x_1 + x_2 = 10; \\ x_1 * x_2 = 21. \end{cases}$$

$$x_1 = 3; x_2 = 7.$$

Therefore, I think that quadratic formula always works and it doesn't seem too hard to use, but one disadvantage is that it can be more time-consuming and maybe not the best way to go, while some other methods may solve a quadratic equation simply and very quickly.