

Quadratic Formula Activity

You may have noticed you are always performing the same steps. Solve the following quadratic equation by completing the square for a generic a , b , and c , in the equation $ax^2 + bx + c = 0$. You can try this on your own, or use the template below, which does this in a slightly different way.

Every quadratic equation can be written in the form $ax^2 + bx + c = 0$. Follow these steps to solve for x .

Divide both sides (and hence each term) by 'a'.

$$x^2 + \underline{\hspace{1cm}}x + \underline{\hspace{1cm}} = 0$$

Subtract the constant term from both sides.

$$x^2 + \underline{\hspace{1cm}}x = \underline{\hspace{1cm}}$$

Complete the square by adding the square of half the coefficient of x to both sides.

$$x^2 + \underline{\hspace{1cm}}x + \underline{\hspace{1cm}} = \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

Factor the left side as a perfect square trinomial, while getting common denominators and adding on the right.

$$(x + \underline{\hspace{1cm}})^2 = \frac{\hspace{1cm}}{4a^2}$$

Take the square root of both sides, simplifying the denominator on the right.

$$x + \underline{\hspace{1cm}} = \frac{\pm\sqrt{\hspace{1cm}}}{\hspace{1cm}}$$

Solve for x .

$$x = \underline{\hspace{1cm}} \pm \frac{\sqrt{\hspace{1cm}}}{\hspace{1cm}}$$

Simplify the quadratic formula by adding the fractions on the right.

$$x = \underline{\hspace{2cm}}$$

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This result tells you where the a, b, and c always go when you complete the square. So now, if you wish, you can skip right to the end when solving these equations, just like when we had equations of the form $(x - h)^2 + k = 0$ and the answer was always

$x = h \pm \sqrt{-k}$. Use the result above to solve the following equations.

1) $x^2 - 10x + 21 = 0$

2) $x^2 + 6x + 4 = 0$

3) $4x^2 - 4x - 12 = 0$

4) $2x^2 - 3x - 9 = 0$

5) $4x^2 + 3x - 1 = 0$

6) $x^2 + 7x = 0$

7) $8x^2 - 14x = -2$

8) $9x^2 - 18x + 3 = 0$

9) $-7x^2 + 1 + 6x = 0$

10) $4(2x - 3)(x - 1) = 2x^2 + 3$

Memorize the quadratic formula. If you want more practice, you can just make up problems for yourself, or ask for more examples.