

Source of Quadratic Formula

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|---|-----------------------------------|
| $ax^2 + bx + c = 0$ | |
| $x^2 + \frac{b}{a}x + \frac{c}{a} = 0$ | Divide both sides by a |
| $x^2 + \frac{b}{a}x = -\frac{c}{a}$ | Subtract constant from both sides |
| $x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} = -\frac{c}{a} + \frac{b^2}{4a^2}$ | Complete the square |
| $\left(x + \frac{b}{2a}\right)^2 = \frac{b^2}{4a^2} - \frac{4ac}{4a^2}$ | Common denominator on right side |
| $\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$ | Add fractions |
| $\left(x + \frac{b}{2a}\right) = \pm\sqrt{\frac{b^2 - 4ac}{4a^2}}$ | Take square root of both sides |
| $x = -\frac{b}{2a} \pm \sqrt{\frac{b^2 - 4ac}{4a^2}}$ | Subtract constant from both sides |
| $x = -\frac{b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$ | Simplify square root |
| $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ | Add fractions |