

Math in TeX notation

When $a \neq 0$, there are two solutions to $ax^2 + bx + c = 0$ and they are

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

$$y = x^2 + bx + c$$

$$= x^2 + 2 \times \frac{b}{2}x + c$$

$$= x^2 + 2 \times \frac{b}{2}x + \left(\frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2 + c$$

$$\left(x + \frac{b}{2}\right)^2$$

$$= \left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2 + c \quad \left| + \left(\frac{b}{2}\right)^2 - c \right.$$

$$y + \left(\frac{b}{2}\right)^2 - c = \left(x + \frac{b}{2}\right)^2 \quad |(\text{vertex form})$$

$$y - y_S = (x - x_S)^2$$

$$S(x_S; y_S) \quad \text{or} \quad S\left(-\frac{b}{2}; \left(\frac{b}{2}\right)^2 - c\right)$$

Math in MathML notation

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