

January 13, 2017

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

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

$$\frac{b}{a} \cdot \frac{1}{2} = \frac{b}{2a}$$

$$\left(\frac{b}{2a}\right)^2 = \frac{b^2}{4a^2}$$

Perfect
Square
Trinomial

$$\boxed{x^2 + \frac{b}{a}x + \frac{b^2}{4a^2}} = -\frac{c}{a} + \frac{b^2}{4a^2}$$

$$\left(x + \frac{b}{2a}\right)^2 = \frac{-c(4a) + b^2}{4a^2}$$

$$\boxed{\left(x + \frac{b}{2a}\right)\left(x + \frac{b}{2a}\right)} = \frac{b^2 - 4ac}{4a^2}$$

F: $x \cdot x = x^2$

O: $(x)\left(\frac{b}{2a}\right) = \frac{b}{2a}x$

I: $\left(\frac{b}{2a}\right)(x) = \frac{b}{2a}x$

T: $\left(\frac{b}{2a}\right)\left(\frac{b}{2a}\right) = \frac{b^2}{4a^2}$

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

$$= \frac{b+b}{2a}x$$

$$= \frac{2b}{2a}x$$

$$= \frac{b}{a}x \checkmark$$

Square Root Property

$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$$

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

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

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

Quadratic Formula