실수에서의 이차방정식의 근의 공식
(Formula of Root of Qudratic Polynomial Equations in $\mathbb{R}$)

Start End

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$$ax^2 + bx + c = 0 \quad (a \neq 0)$$

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$$a \times x^2 + a \times \frac{b}{a}x + c = 0 \quad (\because a \neq 0)$$

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$$a\left(x^2 + \frac{b}{a}x\right) + c = 0 \quad (\because a \neq 0)$$

▸ Start ▸ End

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$$a\left(x^2 + 2 \times \frac{b}{2a}x\right) + c = 0$$

$$a\left\{x^2 + 2 \times \frac{b}{2a}x + \left(\frac{b}{2a}\right)^2 - \left(\frac{b}{2a}\right)^2\right\} + c = 0$$

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$$a\left\{x^2 + 2 \times \frac{b}{2a}x + \left(\frac{b}{2a}\right)^2\right\} - a \times \left(\frac{b}{2a}\right)^2 + c = 0$$

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$$a\left\{x^2 + 2 \times \frac{b}{2a}x + \left(\frac{b}{2a}\right)^2\right\} - a \times \left(\frac{b}{2a}\right)^2 + c = 0$$

$$a\left(x + \frac{b}{2a}\right)^2 - a \times \left(\frac{b}{2a}\right)^2 + c = 0$$

Start End

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$$a\left(x + \frac{b}{2a}\right)^2 - a \times \left(\frac{b}{2a}\right)^2 + c = 0$$

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

Start End

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$$a\left(x + \frac{b}{2a}\right)^2 - a \times \left(\frac{b}{2a}\right)^2 + c = 0$$

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

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

Start End

$$ax^2 + bx + c = 0 \quad (a \neq 0)$$

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

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

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

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

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

$$x + \frac{b}{2a} = \pm\sqrt{\frac{b^2 - 4ac}{4a^2}} \quad (b^2 - 4ac \geq 0)$$

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$$x + \frac{b}{2a} = \begin{cases} \pm\dfrac{\sqrt{b^2 - 4ac}}{2a} & , a > 0 \\ \mp\dfrac{\sqrt{b^2 - 4ac}}{2a} & , a < 0 \end{cases} \quad (b^2 - 4ac \geq 0)$$

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$$x + \frac{b}{2a} = \pm\frac{\sqrt{b^2 - 4ac}}{2a} \quad (b^2 - 4ac \geq 0)$$

$$x = -\frac{b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a} \quad (b^2 - 4ac \geq 0)$$

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$$ax^2 + bx + c = 0 \quad (a \neq 0)$$

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$$\therefore x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad (b^2 - 4ac \geq 0)$$

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Github:
https://min7014.github.io/math20210202001.html

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