

## 2次関数

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

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

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

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

$$= a\left(x + \frac{b}{2a}\right)^2 - \frac{b^2 - 4ac}{4a} \quad \leftarrow \text{頂点}\left(-\frac{b}{2a}, -\frac{b^2 - 4ac}{4a}\right)$$

$$0 = a\left(x + \frac{b}{2a}\right)^2 - \frac{b^2 - 4ac}{4a}$$

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

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

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

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \leftarrow \text{解の公式}$$

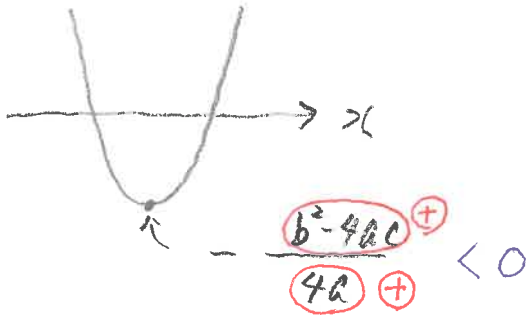


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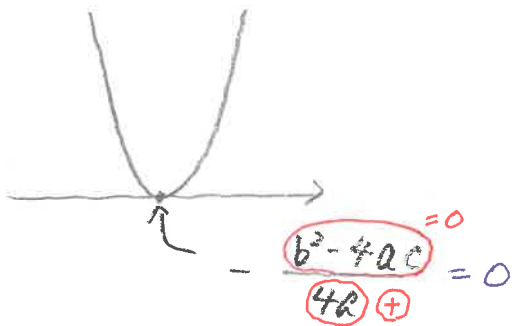
$$y = ax^2 + bx + c$$

$$= a \left( x + \frac{b}{2a} \right)^2 - \frac{b^2 - 4ac}{4a} \quad \leftarrow \text{頂点} \left( -\frac{b}{2a}, -\frac{b^2 - 4ac}{4a} \right)$$

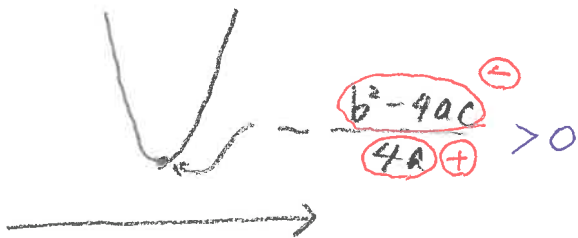
$$a > 0$$



$$b^2 - 4ac > 0$$



$$b^2 - 4ac = 0$$



$$b^2 - 4ac < 0$$