

HUBUNGAN AKAR-AKAR PERSAMAAN KUADRAT

Misalkan x_1 dan x_2 adalah akar-akar persamaan kuadrat $ax^2 + bx + c = 0$, $a \neq 0$ dengan

$x_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$ dan $x_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$, maka diperoleh lihat RUMUS ABC

$$\begin{aligned} x_1 + x_2 &= \frac{-b + \sqrt{b^2 - 4ac}}{2a} + \frac{-b - \sqrt{b^2 - 4ac}}{2a} \\ &= \frac{-b - b + \sqrt{b^2 - 4ac} - \sqrt{b^2 - 4ac}}{2a} \\ &= \frac{-2b}{2a} \\ &= -\frac{b}{a} \end{aligned}$$

$$\begin{aligned} x_1 - x_2 &= \frac{-b + \sqrt{b^2 - 4ac}}{2a} - \frac{-b - \sqrt{b^2 - 4ac}}{2a} \\ &= \frac{-b + b + \sqrt{b^2 - 4ac} + \sqrt{b^2 - 4ac}}{2a} \\ &= \frac{2\sqrt{b^2 - 4ac}}{2a} \\ &= \frac{2D}{a} \end{aligned}$$

$$\begin{aligned} x_1 \cdot x_2 &= \left(\frac{-b + \sqrt{b^2 - 4ac}}{2a} \right) \left(\frac{-b - \sqrt{b^2 - 4ac}}{2a} \right) \\ &= \frac{b^2 - (b^2 - 4ac)}{4a^2} \\ &= \frac{b^2 - b^2 + 4ac}{4a^2} \\ &= \frac{4ac}{4a^2} \\ &= \frac{c}{a} \end{aligned}$$

Jadi, diperoleh

- $x_1 + x_2 = -\frac{b}{a}$
- $x_1 \cdot x_2 = \frac{c}{a}$
- $x_1 - x_2 = \frac{2D}{a}$

Pengembangan

- $x_1^2 + x_2^2 = (x_1 + x_2)^2 - 2x_1 \cdot x_2$
- $\frac{1}{x_1} + \frac{1}{x_2} = \frac{x_2}{x_1 x_2} + \frac{x_1}{x_1 x_2}$
 $= \frac{x_1 + x_2}{x_1 x_2}$