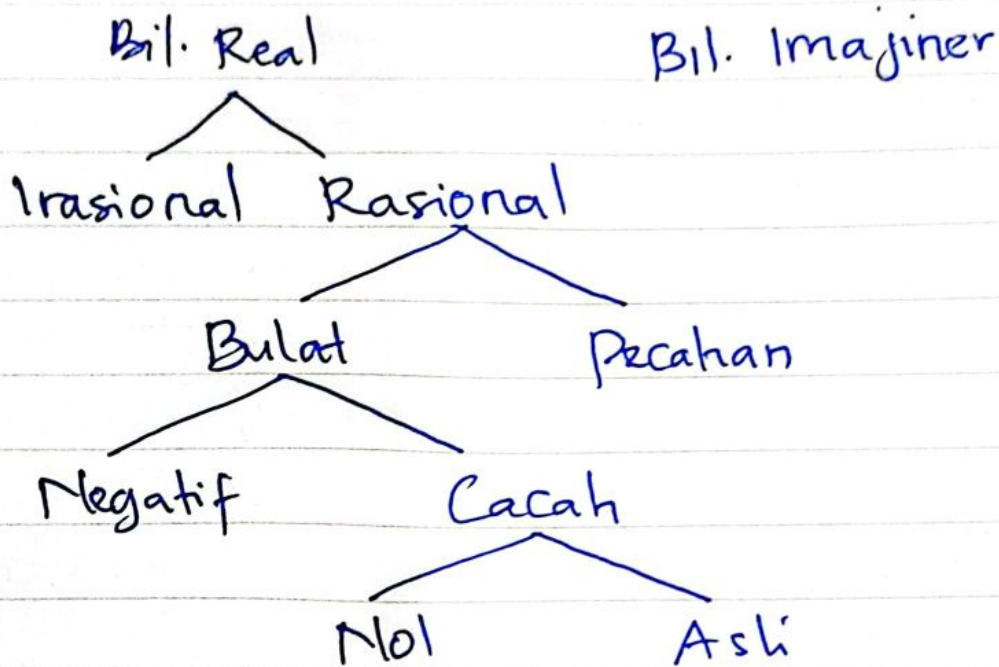


# BILANGAN

Bil. Komplek



\* Bil. Nol =  $\{0\}$

\* Bil. Asli =  $\{1, 2, 3, \dots\}$

\* Bil. Cacah =  $\{0, 1, 2, \dots\}$

\* Bil. Negatif =  $\{\dots, -3, -2, -1\}$

\* Bil. Pecahan =  $\{0.5, \frac{1}{2}, \frac{1}{3}, \dots\}$

\* Bil. Rasional =  $\{\text{gabungan bil. bulat \& pecahan}\}$

\* Bil. Irrasional =  $\{\sqrt{2}, \sqrt{3}, \sqrt{5}, \dots\}$

\* Bil. Real =  $\{\text{gab. rasional \& irrasional}\}$

\* Bil. Irrasional = bil. yg tidak bisa dinyatakan  
kan dlm pecahan / yg bukan  
bil. irrasional



\* Bil. Imajiner = bil. yg merupakan akar kuadrat dari suatu bil. negatif.  
cth =  $\{ \sqrt{-1}, \sqrt{-5}, \text{dll} \}$

$$\begin{aligned} i &= \sqrt{-1} \quad \text{dan} \quad i^2 = -1 \\ \text{jadi} \quad \sqrt{-5} &= \sqrt{(-1) \cdot 5} = \sqrt{-1} \cdot \sqrt{5} \\ &= i\sqrt{5} \\ &= \sqrt{5}i \end{aligned}$$

\* Bil. kompleks = bil. yg mencakup semuanya



## Operasi Bil. Real

\* Menyederhanakan bentuk akar

$$1. \sqrt{ab} = \sqrt{a} \times \sqrt{b}$$

$$2. a\sqrt{c} \pm b\sqrt{c} = (a \pm b)\sqrt{c}$$

$$3. a\sqrt{b} \times c\sqrt{d} = ac\sqrt{bd}$$

$$4. \sqrt{a} \times \sqrt{a} = \sqrt{a^2} = (a^2)^{1/2} = a$$

\* Merasionalkan bentuk suatu pecahan

$$1. \frac{a}{\sqrt{b}} = \frac{a}{\sqrt{b}} \times \frac{\sqrt{b}}{\sqrt{b}} = \frac{a\sqrt{b}}{b}$$

$$2. \frac{k}{a + \sqrt{b}} = \frac{k}{a + \sqrt{b}} \times \frac{a - \sqrt{b}}{a - \sqrt{b}}$$

$$= \frac{k(a - \sqrt{b})}{a^2 - a\sqrt{b} + a\sqrt{b} - \sqrt{b}^2}$$

$$= \frac{ak - k\sqrt{b}}{a^2 - b}$$

$$3. \frac{k}{\sqrt{a} - \sqrt{b}} = \frac{k}{\sqrt{a} - \sqrt{b}} \times \frac{\sqrt{a} + \sqrt{b}}{\sqrt{a} + \sqrt{b}}$$

$$= \frac{k (\sqrt{a} + \sqrt{b})}{a - b}$$

### \* Menyederhanakan Bentuk pangkat

$$1. a^n \times b^n = (ab)^n$$

$$2. a^m \times a^n = a^{(m+n)}$$

$$3. (a^m)^n = a^{m \cdot n}$$

$$4. a^0 = 1$$

$$5. \sqrt{a} = a^{1/2}$$

$$6. \sqrt[n]{a^m} = a^{m/n}$$

$$7. \frac{1}{a^m} = a^{-m}$$

$$8. \frac{a^m}{a^n} = a^{(m-n)}$$



$$9. \frac{a^n}{b^n} = \left[ \frac{a}{b} \right]^n$$

$$10. a^c = b \iff {}^a \log b = c$$

$$11. {}^a \log 1 = 0$$

$$12. {}^a \log a = 1$$

$$13. {}^a \log a^n = n$$

$$14. {}^a \log b^n = n {}^a \log b$$

Contoh :

$$① \frac{2}{\sqrt{3}} = \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3} = \underline{\underline{\frac{2}{3}\sqrt{3}}}$$

$$② \frac{9}{3\sqrt{2}} = \frac{9}{3\sqrt{2}} \times \frac{3\sqrt{2}}{3\sqrt{2}} = \frac{27\sqrt{2}}{9 \cdot 2}$$

$$= \frac{3\sqrt{2}}{2} = \underline{\underline{\frac{3}{2}\sqrt{2}}}$$

$$\begin{aligned}
 \textcircled{3} \quad \frac{4}{3+\sqrt{2}} &= \frac{4}{3+\sqrt{2}} \times \frac{3-\sqrt{2}}{3-\sqrt{2}} \\
 &= \frac{4(3-\sqrt{2})}{9-2} \\
 &= \frac{12-4\sqrt{2}}{7}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{4} \quad \frac{12}{\sqrt{5}-\sqrt{3}} &= \frac{12}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}} \\
 &= \frac{12(\sqrt{5}+\sqrt{3})}{5-3} \\
 &= \frac{12\sqrt{5}+12\sqrt{3}}{2} \\
 &= \underline{6\sqrt{5}+6\sqrt{3}}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{5} \quad (4^2 a^5)^3 &= (4^2)^3 \cdot (a^5)^3 \\
 &= 4^{2 \cdot 3} \cdot a^{5 \cdot 3}
 \end{aligned}$$