

BAB I. PERPANGKATAN DAN BENTUK AKAR

PERPANGKATAN

Pengertian:

$$a^n = \underbrace{a \times a \times a \dots \times a}_{n \text{ faktor}}$$

Sifat-sifat:

1. $a^m \cdot a^n = a^{m+n}$
2. $a^m : a^n = \frac{a^m}{a^n} = a^{m-n}$; $a \neq 0$
3. $(a^m)^n = a^{mn}$
4. $(a \cdot b)^n = a^n \cdot b^n$
5. $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$; $b \neq 0$
6. $a^0 = 1$, $a \neq 0$
7. $a^{-n} = \frac{1}{a^n}$; $a \neq 0$
8. $a^{m/n} = \sqrt[n]{a^m}$

Persamaan pangkat:

1. $a^{f(x)} = a^{g(x)} \Leftrightarrow f(x) = g(x)$
2. $a^{f(x)} = a^p \Leftrightarrow f(x) = p$
untuk $a > 0$ dan $a \neq 1$

Pertidaksamaan:

- $$a^{f(x)} > a^{g(x)} \Leftrightarrow \begin{cases} 1. f(x) > g(x) \text{ untuk } a > 1 \\ 2. f(x) < g(x) \text{ untuk } 0 < a < 1 \end{cases}$$

BENTUK AKAR

Pengertian:

$$a^n = b \Leftrightarrow a = \sqrt[n]{b}$$

Sifat-sifat:

1. $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$
2. $\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$
3. $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$
4. $\sqrt[n]{a^m} = a^{\frac{m}{n}}$
5. $\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b}$
6. $\sqrt[m]{\sqrt[n]{a^m}} = a^{\frac{m}{mn}} = a^{\frac{1}{n}} = \sqrt[n]{a}$
7. $\sqrt[m]{\sqrt[n]{a}} = \sqrt[m]{a^{\frac{1}{n}}} = \sqrt[mn]{a}$
8. $a\sqrt{x} \pm b\sqrt{x} = (a \pm b)\sqrt{x}$
9. $a\sqrt{b} \cdot c\sqrt{d} = ac\sqrt{bd}$
10. $\sqrt{a^2b} = \sqrt{a^2} \times \sqrt{b} = a\sqrt{b}$

Catatan : $\sqrt{a} + \sqrt{b} \neq \sqrt{(a+b)}$

$$\sqrt{a} - \sqrt{b} \neq \sqrt{(a-b)}$$

Merasionalkan Penyebut :

$$1. \frac{1}{\sqrt{a}} = \frac{1}{\sqrt{a}} \cdot \frac{\sqrt{a}}{\sqrt{a}} = \frac{\sqrt{a}}{a} = \frac{1}{a} \sqrt{a}$$

$$2. \frac{1}{\sqrt{a} + \sqrt{b}} = \frac{1}{\sqrt{a} + \sqrt{b}} \cdot \frac{\sqrt{a} - \sqrt{b}}{\sqrt{a} - \sqrt{b}} = \frac{\sqrt{a} - \sqrt{b}}{a - b}$$

$$3. \frac{1}{a - \sqrt{b}} = \frac{1}{a - \sqrt{b}} \cdot \frac{a + \sqrt{b}}{a + \sqrt{b}} = \frac{a + \sqrt{b}}{a^2 - b}$$