CHAPTER 3

Exponential and Logarithm Function (Fungsi Eksponensial dan Logaritma)

Minggu ke-14

3.2 SURDS

- The Operations of Surds

1). $\sqrt{a}\cdot\sqrt{b}=\sqrt{ab}$

2). $\dfrac{\sqrt{a}}{\sqrt{b}}=\sqrt{\dfrac{a}{b}}$

3). $a\sqrt{c}+b\sqrt{c}=(a+b)\sqrt{c}$

4). $a\sqrt{c}-b\sqrt{c}=(a-b)\sqrt{c}$

5). $\sqrt{(a+b)+2\sqrt{ab}}=\sqrt{a}+\sqrt{b}$

6). $\sqrt{(a+b)-2\sqrt{ab}}=\sqrt{a}-\sqrt{b}\quad,a>b$

7). $\sqrt[n]{a^m}=a^{\frac{m}{n}}$

8). $\sqrt[m]{\sqrt[n]{a^k}}=a^{\frac{k}{m\times n}}$

9). $\sqrt{-1}=i$

$i\Rightarrow bilanganimajiner$

- Rationalizing The Denominator of A Surds Fraction

Form: $\frac{a}{\sqrt{b}} \Rightarrow \frac{a}{\sqrt{b}} \times \frac{\sqrt{b}}{\sqrt{b}} = \frac{a\sqrt{b}}{b}$

Form: $\frac{a}{\sqrt{b}+\sqrt{c}} \Rightarrow \frac{a}{\sqrt{b}+\sqrt{c}} \times \frac{\sqrt{b}-\sqrt{c}}{\sqrt{b}-\sqrt{c}} = \frac{a\left(\sqrt{b}-\sqrt{c}\right)}{b-c}$

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CONTOH 1:

Hitung dan sederhanakan bentuk akar berikut ini:

a) $\sqrt{2} + 3\sqrt{2} + 5\sqrt{2} = (1+3+5)\sqrt{2} = 9\sqrt{2}$

b) $5\sqrt{3} + 3\sqrt{3} - \sqrt{3} = (5+3-1)\sqrt{3} = 7\sqrt{3}$

c) $8\sqrt{3} + 6\sqrt{2} + 12\sqrt{3} - 4\sqrt{2}$

$= (8+12)\sqrt{3} + (6-4)\sqrt{2} = 20\sqrt{3} + 2\sqrt{2}$

CONTOH 2:

Sederhanakan bentuk berikut:

a). $\dfrac{5}{\sqrt{2}+\sqrt{3}}$

Kali bentuk sekawan

$$= \frac{5}{\sqrt{2}+\sqrt{3}} \times \frac{\sqrt{2}-\sqrt{3}}{\sqrt{2}-\sqrt{3}} = \frac{5\left(\sqrt{2}-\sqrt{3}\right)}{\left(\sqrt{2}+\sqrt{3}\right)\left(\sqrt{2}-\sqrt{3}\right)}$$

$$= \frac{5\sqrt{2}-5\sqrt{3}}{2-3} = \frac{5\sqrt{2}-5\sqrt{3}}{-1} = 5\sqrt{3}-5\sqrt{2}$$

b). $\frac{5}{\sqrt{2}-\sqrt{3}}$

Kali bentuk sekawan

$$= \frac{5}{\sqrt{2}-\sqrt{3}} \times \frac{\sqrt{2}+\sqrt{3}}{\sqrt{2}+\sqrt{3}} = \frac{5\left(\sqrt{2}+\sqrt{3}\right)}{\left(\sqrt{2}-\sqrt{3}\right)\left(\sqrt{2}+\sqrt{3}\right)}$$

$$= \frac{5\sqrt{2}+5\sqrt{3}}{2-3} = \frac{5\sqrt{2}+5\sqrt{3}}{-1} = -5\sqrt{2}-5\sqrt{3}$$

CONTOH 3:

Sederhanakan bentuk berikut:

$$\frac{7}{\sqrt{2}+\sqrt{3}-\sqrt{5}}$$

Pembahasan

$$\frac{7}{\sqrt{2}+\sqrt{3}-\sqrt{5}} \times \frac{(\sqrt{2}+\sqrt{3}+\sqrt{5})}{(\sqrt{2}+\sqrt{3}+\sqrt{5})} = \frac{7\sqrt{2}+7\sqrt{3}+7\sqrt{5}}{2+3+2\sqrt{6}-5}$$

$$= \frac{7\sqrt{2}+7\sqrt{3}+7\sqrt{5}}{2\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}} = \frac{7\sqrt{12}+7\sqrt{18}+7\sqrt{30}}{12}$$

$$= \frac{14\sqrt{3}+21\sqrt{2}+7\sqrt{30}}{12} = \frac{7}{6}\sqrt{3}+\frac{7}{4}\sqrt{2}+\frac{7}{12}\sqrt{30}$$

CONTOH 4:

$$\sqrt{5+\sqrt{24}} = \ldots\ldots$$

INGAT: $\sqrt{(a+b)+2\sqrt{ab}} = \sqrt{a}+\sqrt{b}$

$$\sqrt{5+\sqrt{24}}$$

$$= \sqrt{5+\sqrt{4\times 6}} = \sqrt{5+2\sqrt{6}}$$

$$= \sqrt{(3+2)+2\sqrt{3\times 2}}$$

$$= \sqrt{3}+\sqrt{2}$$