

OPERASI ALJABAR BENTUK AKAR
SMA SHAFTA SURABAYA
KELAS X

Operasi Aljabar Bentuk Akar

Jika a dan b bilangan rasional positif,

1. $\sqrt{a} + \sqrt{b} = \sqrt{b} + \sqrt{a}$

2. $x\sqrt{a} \pm y\sqrt{a} = (x \pm y)\sqrt{a}$

3. $\sqrt{a} \times \sqrt{a} = a$

4. $x\sqrt{a} \times y\sqrt{b} = (x \times y)\sqrt{a \times b}$

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

6. $\frac{x\sqrt{a}}{y\sqrt{b}} = \frac{x}{y} \sqrt{\frac{a}{b}}$

Contoh:

Sederhanakan.

a. $\sqrt{2} + 4\sqrt{2}$

b. $\sqrt{12} - 5\sqrt{3}$

c. $2\sqrt{5} + \sqrt{80} - 3\sqrt{20}$

d. $5\sqrt{2} \times 2\sqrt{5}$

Jawab:

a. $\sqrt{2} + 4\sqrt{2} = (1 + 4)\sqrt{2} = 5\sqrt{2}$

b. $\sqrt{12} - 5\sqrt{3} = \sqrt{4 \times 3} - 5\sqrt{3} = 2\sqrt{3} - 5\sqrt{3} = (2 - 5)\sqrt{3} = -3\sqrt{3}$

c. $\begin{aligned}\sqrt{5} + \sqrt{80} - 3\sqrt{20} &= \sqrt{5} + \sqrt{16 \times 5} - 3\sqrt{4 \times 5} \\ &= \sqrt{5} + 4\sqrt{5} - 3 \cdot 2\sqrt{5} \\ &= \sqrt{5} + 4\sqrt{5} - 6\sqrt{5} \\ &= (1 + 4 - 6)\sqrt{5} \\ &= -\sqrt{5}\end{aligned}$

d. $5\sqrt{2} \times 3\sqrt{5} = (5 \times 3)\sqrt{2 \times 5} = 15\sqrt{10}$

Uji Pemahaman

1. Sederhanakan operasi penjumlahan dan pengurangan berikut.

- a. $3\sqrt{3} + \sqrt{3}$
- b. $2\sqrt{3} - \sqrt{3}$
- c. $2\sqrt{5} + 4\sqrt{5}$
- d. $\sqrt{8} + \sqrt{2}$
- e. $\sqrt{5} + 2\sqrt{5} - 3\sqrt{5}$
- f. $6\sqrt{2} + 4\sqrt{2} - 10\sqrt{2}$
- g. $2\sqrt{20} - \sqrt{80}$
- h. $3\sqrt{32} - 2\sqrt{50}$
- i. $(3\sqrt{2} + 2\sqrt{2})^2$
- j. $2\sqrt{63} + 3\sqrt{20} - 2\sqrt{28} + 3\sqrt{80}$

2. Sederhanakan operasi perkalian berikut.

- a. $\sqrt{2} \times \sqrt{3}$
- b. $\sqrt{6} \times \sqrt{10}$
- c. $\sqrt{7} \times \sqrt{7}$
- d. $\sqrt{3} \times \sqrt{12}$
- e. $\sqrt{2} \times \sqrt{8}$
- f. $\sqrt{5} \times \sqrt{20}$
- g. $2\sqrt{5} \times 3\sqrt{2}$
- h. $8\sqrt{2} \times 3\sqrt{3}$
- i. $6\sqrt{3} \times 2\sqrt{15}$
- j. $2\sqrt{5}(3\sqrt{10} + 4\sqrt{5})$
- k. $-5\sqrt{6}(4\sqrt{2} - 3\sqrt{6})$

3. Selesaikan

- a. $(\sqrt{2} - \sqrt{3})(\sqrt{6} - \sqrt{2})$
- b. $(\sqrt{3} - 2)(\sqrt{2} + 3)$
- c. $(\sqrt{11} + \sqrt{3})(\sqrt{22} - \sqrt{6})$
- d. $(2\sqrt{3} - \sqrt{2})(2\sqrt{3} - 3)$
- e. $(\sqrt{5} + \sqrt{3})^2$