

Asah kemampuan 3.2

1 Dengan menggunakan sifat logaritma tentukan nilai berikut:

a ${}^2 \log 4 =$

b ${}^9 \log 64 =$

c ${}^6 \log 216 =$

d ${}^5 \log 625 =$

2 Sederhanakan bentuk logaritma berikut:

a ${}^2 \log 50 + {}^2 \log 8 - {}^2 \log 100 =$

b ${}^2 \log 24 - {}^2 \log 15 + {}^2 \log 30 - {}^2 \log 6 =$

c ${}^2 \log 16 + {}^3 \log 27 - {}^5 \log \frac{1}{625} =$

d ${}^2 \log \sqrt{8} + {}^2 \log \sqrt{2} - {}^2 \log 16 =$

3 Sederhanakan bentuk logaritma berikut:

a ${}^2 \log 3 \cdot {}^3 \log 64 =$

b ${}^2 \log 3 \cdot {}^3 \log 5 \cdot {}^5 \log 6 \cdot {}^6 \log 8 =$

c ${}^9 \log 9 \cdot {}^3 \log 125 \cdot {}^{25} \log 16 =$

4 Jika diketahui $\log 3 = 0,4771$ dan $\log 5 = 0,6990$, tentukan nilai berikut:

a $\log 25$

b $\log 45$

c $\log 0,36$

(Jawaban)

1 a ${}^2 \log 4 = {}^2 \log 2^2$

$= 2 \cdot {}^2 \log 2$

$= 2 \cdot 1 = 2$

b ${}^9 \log 64 = {}^9 \log 9^3$

$= 3 \cdot {}^9 \log 9$

$= 3 \cdot 1 = 3$

c ${}^6 \log 216 = {}^6 \log 6^3$

$= 3 \cdot {}^6 \log 6$

$= 3 \cdot 1 = 3$

d ${}^5 \log 625 = {}^5 \log 5^4$

$= 4 \cdot {}^5 \log 5 > 4 \cdot 1 = -4$

$$2 \text{ a } {}^2\log 50 + {}^2\log 8 - {}^2\log 100 = {}^2\log \frac{50 \times 8}{100} = {}^2\log \frac{400}{100} = {}^2\log 4 = 2$$

$$\text{b } {}^2\log 24 - {}^2\log 15 + {}^2\log 30 - {}^2\log 6 = {}^2\log \frac{24 \times 30}{15 \times 6} = {}^2\log \frac{240}{90} = {}^2\log \frac{8}{3} = {}^2\log 2 \\ = 3.143$$

$$\text{c } {}^2\log 16 + {}^3\log 27 - {}^5\log \frac{1}{625} = {}^2\log 16 \times {}^3\log 27 : {}^5\log 2^4 \times {}^3\log 3^5 \\ = \frac{{}^2\log 16}{{}^5\log 625} \cdot {}^3\log 27 : {}^5\log (5^3)^{-1} \\ = \frac{4 \cdot {}^2\log 2 \times 3 \cdot {}^3\log 3}{-9 \cdot {}^5\log 5} \\ = 4 \cdot 1 \cdot 3 \cdot 1 \\ = 12 \\ = \frac{12}{-9} = -3$$

$$\text{d } {}^2\log \sqrt{8} + {}^2\log \sqrt{2} - {}^2\log 16 = {}^2\log \frac{\sqrt{8} \times \sqrt{2}}{16} : {}^2\log \frac{\sqrt{16}}{16} : {}^2\log \frac{9}{16} : {}^2\log \frac{2}{8} \\ = {}^2\log \frac{1}{4}$$

$$3 \text{ a } {}^2\log 3 \cdot {}^3\log 64 = {}^2\log 64 = {}^2\log 2^6 = 6 \cdot {}^2\log 2 = 6 \cdot 1 = 6$$

$$\text{b } {}^2\log 3 \cdot {}^3\log 5 \cdot {}^5\log 6 \cdot {}^6\log 8 = {}^2\log 8 - {}^2\log 2^3 = 3 \cdot {}^2\log 2 = 3 \cdot 1 = 3$$

$$\text{c } {}^9\log 9 \cdot {}^3\log 125 \cdot {}^{25}\log 16 = {}^2\log 3^2 \cdot {}^3\log 5^3 \cdot {}^5\log 2^5 : \frac{2}{2} \cdot {}^2\log 3 \cdot {}^3\log 5 \cdot {}^5\log 2 \\ = 1 \cdot {}^2\log 3 \cdot 3 \cdot {}^3\log 5 \cdot 2 \cdot {}^5\log 2 \\ = 6 \cdot {}^2\log 2 \\ = 6 \cdot 1 = 6$$

$$\text{a } \log 25 = \log(5 \times 5) = \log 5 + \log 5 = 0.6990 + 0.6990 = 1.3980$$

$$\text{b } \log 95 = \log(9 \times 5) = \log 9 + \log 5 = \log 3^2 + \log 5 = 2 \cdot \log 3 + \log 5 \\ = 2 \cdot 0.4771 + 0.6990 = 0.9542 + 0.6990 = 1.6532$$

$$\text{6 } \log 0.36 = \log \frac{36}{100} = \log \frac{6^2}{10^2} = \log \frac{(3 \times 2)^2}{(5 \times 2)^2} = \frac{\log 3^2 + \log 2^2}{\log 5^2 + \log 2^2} \\ = \frac{2 \cdot \log 3 + 2 \cdot \log 2}{2 \cdot \log 5 + 2 \cdot \log 2} = \frac{2 \cdot 0.4771 + 2 \cdot 0.6990}{2 \cdot 0.6990 + 2 \cdot 0.4771} = \frac{1.6532}{1.3980}$$