

Potenzen

Wurzeln

Potenz gesucht

$$3^4 = 81$$

3 · 3 · 3 · 3

Basis gesucht

$$4 \sqrt[4]{81} = 3$$

Exponent gesucht

$$\log_3 81 = 4$$

Logarithmen

Potenzen

$$a^m \cdot a^n = a^{m+n}$$

$$\frac{5^1 \cdot 5^2 = 5^{1+2} = 5^3}{5 \cdot 5 \cdot 5 = 5 \cdot 5 \cdot 5}$$

$$= 125$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$\frac{4^4}{4^2} = \frac{\cancel{4} \cdot \cancel{4} \cdot 4 \cdot 4}{\cancel{4} \cdot \cancel{4}}$$

$$= 4^{4-2} = 4^2$$

$$(a \cdot b)^n = a^n \cdot b^n$$

$$\frac{(2 \cdot 4)^3 = 2^3 \cdot 4^3 = 512}{8 \cdot 8 \cdot 8 = 8 \cdot 64}$$

$$\frac{a^n}{b^n} = \left(\frac{a}{b}\right)^n$$

$$\frac{4^3}{3^3} = \left(\frac{4}{3}\right)^3$$

Wurzeln

B 6

$${}^n\sqrt{a \cdot b} = {}^n\sqrt{a} \cdot {}^n\sqrt{b}$$

$${}^3\sqrt{8 \cdot 27} = {}^3\sqrt{8} \cdot {}^3\sqrt{27}$$

$${}^3\sqrt{216} = 2 \cdot 3 = \underline{\underline{6}}$$



$${}^n\sqrt{\frac{a}{b}} = \frac{{}^n\sqrt{a}}{{}^n\sqrt{b}}$$

$${}^3\sqrt{\frac{216}{8}}$$

$$= \frac{{}^3\sqrt{216}}{{}^3\sqrt{8}}$$

$${}^3\sqrt{27}$$

$$= \frac{6}{2} = \underline{\underline{3}}$$

$$3 \cdot 3 \cdot 3$$

$$216 = 6 \cdot 6 \cdot 6$$

$$8 = 2 \cdot 2 \cdot 2$$

Logarithmen

B 7

$$\log_a (u \cdot v) = \log_a u + \log_a v$$

$$\log_6 (216 \cdot 36) = \log_6 216 + \log_6 36$$

7776

$$= \underbrace{6 \cdot 6 \cdot 6 \cdot 6 \cdot 6}_{5 \text{ mal}} \cdot \underbrace{6 \cdot 6 \cdot 6}_{3 \text{ mal}} \cdot \underbrace{6 \cdot 6}_{2 \text{ mal}}$$

$$\log_6 (7776) = 5 = \log_6 216 + \log_6 36 = 3 + 2$$

$$\log_a \left(\frac{u}{v}\right) = \log_a u - \log_a v$$

$$\log_2 \left(\frac{8}{4}\right) = \log_2 8 - \log_2 4 = 3 - 2 = 1$$

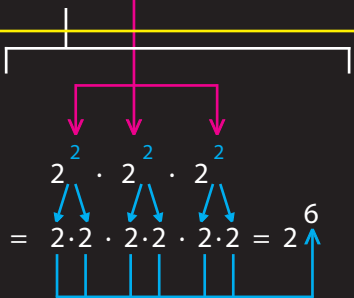
$\log_2 2 = 1$ $(=) 2^3 = 8$ $(=) 2^2 = 4$

Weitere Regel: Potenzrechnung

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

$$(a^2)^3 = a^{2 \cdot 3} = a^6$$

$$(2^2)^3 = 2^{2 \cdot 3} = 2^6 = 64$$



Weitere Regel: Rechnen mit Logarithmen

$$\log_a(u^n) = n \log_a u$$

$$x = \log_2(4^3) = 3 \log_2 4 = 3 \cdot 2 = 6$$

