

MULTIPLIKATION	DIVISION
$a^n \cdot a^m = a^{n+m}$	$a^n : a^m = a^{n-m}$
$a^n \cdot b^n = (a \cdot b)^n$	$a^n : b^n = (a:b)^n = \left(\frac{a}{b}\right)^n$
$(a^n)^m = a^{n \cdot m}$	

Aufgaben:

Fasse so weit wie möglich zusammen und berechne.

1. Multiplikation:

a) $2^3 \cdot 2^5$

b) $5^4 \cdot 5^2$

c) $4^{-2} \cdot 4^4$

d) $3^2 \cdot 2^2$

e) $4^3 \cdot 2^3$

f) $(-2)^3 \cdot 1^3$

g) $(2^3)^2$

h) $(4^2)^2$

i) $(5^{-2})^3$

2. Division:

a) $2^3 : 2^1$

b) $4^4 : 4^3$

c) $3^3 : 3^{-2}$

d) $5^2 : 5^4$

e) $2^4 : 2^5$

f) $4^{-1} : 4^2$

g) $5^2 : 6^2$

h) $(-4)^3 : 2^3$

i) $3^{-2} : 2^{-2}$

Lösungen: Potenzgesetze

Aufgaben:

1. Multiplikation:

$$a) 2^3 \cdot 2^5 = 2^{3+5} = 2^8 = 256$$

$$b) 5^4 \cdot 5^2 = 5^{4+2} = 5^6 = 15625$$

$$c) 4^{-2} \cdot 4^4 = 4^{-2+4} = 4^2 = 16$$

$$d) 3^2 \cdot 2^2 = (3 \cdot 2)^2 = (6)^2 = 36$$

$$e) 4^3 \cdot 2^3 = (4 \cdot 2)^3 = 8^3 = 512$$

$$f) (-2)^3 \cdot 1^3 = (-2 \cdot 1)^3 = (-2)^3 = -8$$

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

$$h) (4^2)^2 = 4^{2 \cdot 2} = 4^4 = 256$$

$$i) (5^{-2})^3 = 5^{-2 \cdot 3} = 5^{-6} = \frac{1}{5^6} = \frac{1}{15625}$$

2. Division:

$$a) 2^3 : 2^1 = 2^{3-1} = 2^2 = 4$$

$$b) 4^4 : 4^3 = 4^{4-3} = 4^1 = 4$$

$$c) 3^3 : 3^{-2} = 3^{3-(-2)} = 3^{3+2} = 3^5 = 243$$

$$d) 5^2 : 5^4 = 5^{2-4} = 5^{-2} = \frac{1}{5^2} = \frac{1}{25} = 0,04$$

$$e) 2^4 : 2^5 = 2^{4-5} = 2^{-1} = \frac{1}{2^1} = \frac{1}{2} = 0,5$$

$$f) 4^{-1} : 4^2 = 4^{-1-2} = 4^{-3} = \frac{1}{4^3} = \frac{1}{64}$$

$$g) 5^2 : 6^2 = \left(\frac{5}{6}\right)^2 = \left(\frac{5}{6}\right)\left(\frac{5}{6}\right) = \frac{25}{36}$$

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

$$i) 3^{-2} : 2^{-2} = \left(\frac{3}{2}\right)^{-2} = \frac{1}{\left(\frac{3}{2}\right)^2} = \frac{1}{\left(\frac{3}{2}\right)\left(\frac{3}{2}\right)} = \frac{1}{\frac{9}{4}} = 1 : \frac{9}{4} = 1 \cdot \frac{4}{9} = \frac{4}{9}$$