

Aufgabe 5

a) $2^4 = 16$

b) $-2^4 = -16$

c) $(-2)^4 = 16$

d) $2^{-4} = \frac{1}{2^4} = \frac{1}{16}$

e) $(-2)^{-4} = \frac{1}{(-2)^4} = \frac{1}{16}$

f) $-2^{-4} = -\frac{1}{2^4} = -\frac{1}{16}$

g) $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

h) $5^0 = 1$

i) $10^{-6} = \frac{1}{10^6} = \frac{1}{1.000.000}$

j) $\left(\frac{1}{3}\right)^0 = 1$

k) $\frac{1}{4^{-2}} = \frac{1}{\frac{1}{4^2}} = \frac{1}{\frac{1}{16}} = 16$

l) 0^{-3} — nicht definiert!

m) $(19^2)^0 = 19^0 = 1$

$$n) (-1)^{-1} = \frac{1}{1^1} = \frac{1}{1} = 1$$

$$o) (-3)^{-1} = \frac{1}{(-3)^1} = -\frac{1}{3}$$

$$p) \left(\frac{2}{5}\right)^{-2} = \frac{1}{\left(\frac{2}{5}\right)^2} = \frac{1}{\frac{4}{25}} = \frac{25}{4} = 6\frac{1}{4}$$

$$q) (3^2)^{-2} = 3^{-4} = \frac{1}{3^4} = \frac{1}{81}$$

$$r) (1^3)^{-4} = 1^{-12} = \frac{1}{1^{12}} = \frac{1}{1} = 1$$

Aufgabe 6

$$a) 2^{-1} \cdot 2^{-1} = 2^{-1+(-1)} = 2^{-2} = \frac{1}{2^2} = \frac{1}{4}$$

$$b) 7^2 \cdot 7^{-4} = 7^{2+(-4)} = 7^{-2} = \frac{1}{7^2} = \frac{1}{49}$$

c)

$$\begin{aligned} \left(\frac{1}{3}\right)^{-1} \cdot \left(\frac{1}{3}\right)^{-2} &= \left(\frac{1}{3}\right)^{-1+(-2)} \\ &= \left(\frac{1}{3}\right)^{-3} = \frac{1}{\left(\frac{1}{3}\right)^3} \\ &= \frac{1}{\frac{1}{27}} = 27 \end{aligned}$$

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

e)

$$\begin{aligned} 0,2^3 : 0,2^5 &= 0,2^{3-5} = 0,2^{-2} \\ &= \frac{1}{0,2^2} = \frac{1}{0,04} \\ &= \frac{1}{\frac{4}{100}} = \frac{100}{4} = 25 \end{aligned}$$

$$f) \left(\frac{2}{5}\right)^4 \cdot \left(\frac{2}{5}\right)^{-4} = \left(\frac{2}{5}\right)^{4+(-4)} = \left(\frac{2}{5}\right)^0 = 1$$

$$g) 0,5^{-3} \cdot 0,5^0 \cdot 0,5^3 \cdot 2 = 0,5^{-3+0+3} \cdot 2 = 0,5^0 \cdot 2 = 1 \cdot 2 = 2$$

$$h) 0,25^3 \cdot 4^3 = (0,25 \cdot 4)^3 = 1^3 = 1$$

$$i) 10^4 : 5^4 = (10 : 5)^4 = 2^4 = 16$$

$$j) \frac{4^2 \cdot 9^2}{36^2} = \left(\frac{4 \cdot 9}{36}\right)^2 = \left(\frac{36}{36}\right)^2 = 1^2 = 1$$

$$k) 7^{-3} : 7^4 = 7^{-3-4} = 7^{-7} = \frac{1}{7^7}$$

$$l) 0,5^6 : 0,5^{-4} = 0,5^{6-(-4)} = 0,5^{10} = \left(\frac{1}{2}\right)^{10} = \frac{1^{10}}{2^{10}} = \frac{1}{1024}$$

m)

$$\begin{aligned} (-5)^{-1} : (-5)^{-2} &= (-5)^{-1-(-2)} = (-5)^{-3} \\ &= \frac{1}{(-5)^3} = \frac{1}{-125} = -\frac{1}{125} \end{aligned}$$

$$n) 13^{-4} : 39^{-4} = \left(\frac{13}{39}\right)^{-4} = \left(\frac{1}{3}\right)^{-4} = \frac{1}{\left(\frac{1}{3}\right)^4} = \frac{1}{\frac{1}{81}} = 81$$

o)

$$\begin{aligned}4^{-3} \cdot 0,25^{-3} \cdot (-3)^3 &= (4 \cdot 0,25)^{-3} \cdot (-27) \\ &= 1^{-3} \cdot (-27) \\ &= \frac{1}{1^3} \cdot (-27) = -27\end{aligned}$$

$$\text{p) } -5^{-2} : (-5)^4 = -5^{-2} : 5^4 = -5^{-2-4} = -5^{-6} = -\frac{1}{5^6}$$