

MOCNINY S PŘIROZENÝM MOČNITELEM

$$\forall a \in \mathbb{R}; \forall n \in \mathbb{N}:$$

$$a^n = \underbrace{a \cdot \dots \cdot a}_{n\text{-krát}}$$

11 2-8:08

$$a > 0 \Rightarrow a^n > 0$$

$$a < 0 \Rightarrow a^{2n} > 0$$

$$a^{2n-1} < 0$$

... sudá mocnina
(-1)²

$$a^1 = a$$

$$1^n = 1$$

$$0^n = 0$$

11 2-8:13

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

$$\left(\frac{1}{2}\right)^3 = \frac{1}{8}$$

$$17\,000 = 1,7 \cdot 10^4$$

$$321\,0000 = 3,21 \cdot 10^6$$

11 2-8:20

$$\forall a, b \in \mathbb{R}$$

$$\forall r, s \in \mathbb{N} :$$

$$a^r \cdot a^s = a^{r+s}$$

$$(a^r)^s = a^{r \cdot s}$$

$$\frac{a^r}{a^s} = a^{r-s} \quad \begin{matrix} r > s \\ a \neq 0 \end{matrix}$$

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

$$\left(\frac{a}{b}\right)^r = \frac{a^r}{b^r} \quad b \neq 0$$

11 2-8:23

124/6.7

$\hookrightarrow \frac{2x^5y^3}{(2x^2y)^2} : \left(\frac{xy}{2xy^2}\right)^3 =$ $x, y \neq 0$

$\frac{2x^5y^3}{(2x^2y)^2} \cdot \left(\frac{2xy^2}{xy}\right)^3 =$

$\frac{2x^5y^3 \cdot 8x^3y^4}{4x^4y^2 \cdot x^2y^3} = 4xy^4$

$\frac{16x^8y^9}{4x^7y^5} = 4x^{(8-7)}y^{(9-5)}$

$= 4xy^4$

$\frac{2 \cdot 8}{4} \cdot x^{(5+3-4-3)}y^{(3+6-2-3)}$

11 2-8:28

$\frac{(-3)^3 \cdot (-3)^6}{(-3)^5 \cdot 3^2} = (-3)^{3+6-5} \cdot 3^{-2}$

$= (-3)^4 \cdot 3^{-2} = 3^2 = \underline{\underline{9}}$

$= \frac{(-3)^{3+6}}{(-3)^5 \cdot 3^2} = \frac{(-3)^9}{(-3)^5 \cdot 3^2}$

$= \frac{((-1) \cdot 3)^4}{3^2} : \frac{(-1)^4 \cdot 3^{4+2}}{3^2} = \underline{\underline{9}}$

11 3-9:02

$$\frac{(-2)^5 \cdot 2^6}{(-2)^4 \cdot 2^2} = - \frac{2^{5+6}}{2^{4+2}} = - \frac{2^{11}}{2^6} = \underline{\underline{-2^5}}$$

$$= - \frac{2^{5+6-4-2}}{1} = \underline{\underline{-2^5}}$$

2 -2
 (-1) · 2

11 3-9:09

$a, b \neq 0$

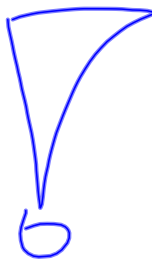
$$\frac{(a^2 \cdot b^3)^3 \cdot a^4}{(a^3 \cdot b^2)^3} = \frac{a^{2 \cdot 3} \cdot b^{3 \cdot 3} \cdot a^4}{a^{3 \cdot 3} \cdot b^{2 \cdot 3}} =$$

$$= a^{6+4-9} b^{9-6} = \underline{\underline{a \cdot b^3}}$$

$$= \frac{\cancel{a \cdot a} \cdot \cancel{a \cdot a} \cdot (a \cdot a) \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot a \cdot a \cdot a \cdot a}{\cancel{a \cdot a \cdot a} \cdot \cancel{a \cdot a \cdot a} \cdot \cancel{a \cdot a \cdot a} \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b}$$

11 3-9:13

$$[(-a) \cdot b]^3 (-a^4 b^3)^5$$

$$(-1 \cdot a^4 \cdot b^3)^5$$


$$(-1)^3 \cdot b^3 \cdot (-1)^5 \cdot a^{20} \cdot b^{15}$$

$$+ \underline{\underline{a^{23} b^{18}}}$$

11 3-9:19

$$\frac{(a^3 \cdot b)^3}{b^2} \cdot \left(\frac{b}{a}\right)^2$$

 $a, b \neq 0$

$$= \frac{a^6 \cdot b^3 \cdot b^2}{b^2 \cdot a^2} = a^{6-2} b^{3+2-2} = \underline{\underline{a^4 b^3}}$$

$$= \frac{\cancel{a^6}^4 \cdot b^3 \cdot \cancel{b^2}^2}{\cancel{b^2}^2 \cdot \cancel{a^2}^2} = a^4 b^3$$

$$\frac{a^6 \cdot b^3 \cdot \cancel{b^2}^2}{\cancel{b^2}^2 \cdot a^2} = a^{6-2} \cdot b^3$$

11 3-9:25

$$\left(\frac{a^2 \cdot b^7}{b^2 \cdot (-a)^4} \cdot \frac{(-a)^3}{b^3} \right)^2 =$$

$a, b \neq 0$

$$= \left(a^{2+3-4} b^{7-2-3} \right)^2$$

$$= \left(a \cdot b^2 \right)^2 = \underline{\underline{a^2 b^4}}$$

11 3-9:31

$$\frac{8^2 \cdot 6^3}{4^3 \cdot 12} = \frac{\cancel{(2^3)^2} \cdot (2 \cdot 3)^3}{\cancel{(2^2)^3} \cdot 2^2 \cdot 3} = \underline{\underline{2 \cdot 3^2}}$$

P: 62/39

$$\frac{(2 \cdot 2 \cdot 2)^2 \cdot (2 \cdot 3)^3}{(2 \cdot 2)^3 \cdot 2 \cdot 2 \cdot 3}$$

11 3-9:36

$a \neq 0$

$$\frac{a^5}{a^2} = a^{5-2} = a^3 \quad \frac{a \cdot a \cdot a \cdot \cancel{a} \cdot \cancel{a}}{\cancel{a} \cdot \cancel{a}}$$

$$\frac{a^5}{a^3} = a^{5-3} = a^2 \quad \frac{a \cdot a \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a}}{\cancel{a} \cdot \cancel{a} \cdot \cancel{a}}$$

$$\frac{a^5}{a^4} = a^{5-4} = a^1 \quad \frac{a \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a}}{\cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a}}$$

$r = s$

$$\frac{a^5}{a^5} = a^{5-5} = \boxed{a^0 = 1} \quad \frac{\cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a}}{\cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a}}$$

$r < s$

$$\frac{a^5}{a^6} = a^{5-6} = \boxed{a^{-1} = \frac{1}{a}} \quad \frac{\cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a}}{\cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot a}$$

11 4-9:07

$a \neq 0$

$$\frac{a^r}{a^s} = a^{r-s}$$

$x^0 = 1$

$0^y = 0$

$a^0 = a^{r-r} = \frac{a^r}{a^r}$

$\frac{0^r}{0^r} = \frac{0}{0} = ?$

11 4-9:17

$$\frac{1}{4} = \frac{1}{2^2} = \frac{2^0}{2^2} = 2^{0-2} = 2^{-2}$$

$$\frac{m}{s} = m \cdot s^{-1}$$

$$\frac{1}{27} = \frac{1}{3^3} = \boxed{\frac{3^0}{3^3} = 3^{0-3} = 3^{-3}}$$

$$\frac{a^3 \cdot b^2}{a^2} = a^{3-2} \cdot b^2 = \underline{\underline{ab^2}}$$

11 4-9:22

$$3^{-15} \cdot 3^{23} = 3^8$$

$$(2^7)^{-3} = \frac{1}{2^{21}}$$

$$\frac{4^8}{4^{-12}} = 4^{8-(-12)} = 4^{20} = \underline{\underline{2^{40}}}$$

$$\frac{2^{-6}}{2^5} = 2^{-6-5} = 2^{-11} = \frac{1}{2^{11}}$$

$$(a^2b)^{-2} \cdot (a^{-3})^{-2} \cdot b^4b^{-3} = \text{a,b} \neq 0$$

$$= a^{-4}b^{-2} a^6 b^4b^{-3} =$$

$$= a^{-4+6} b^{-2+4-3} = a^2b^{-1} = \underline{\underline{\frac{a^2}{b}}}$$

11 4-9:26

$$\left(\frac{a^{-2}}{b^3}\right)^{-2}$$

$$\left(\frac{a^2}{b^3}\right)^{-2} \cdot \frac{(a^{-2} \cdot b)^3}{(ab)^{-2}}$$

Peč: 62 / 37, 39

$$\frac{a^4}{b^{-6}} = a^4 \cdot b^6$$

Podmínky!

11 4-9:31

A or B

A XOR B

A	B	A xor B
1	0	1
1	1	0
0	0	0
0	1	1

11 4-9:38

$$\begin{aligned}
 \left(\frac{3}{4}\right)^{-4} &= \left(\frac{3}{2^2}\right)^{-4} = \frac{1}{\left(\frac{3}{2^2}\right)^4} = \frac{1}{\frac{3^4}{2^8}} = \frac{2^8}{3^4} \\
 \left(\frac{3}{4}\right)^{-4} &= \frac{3^{-4}}{4^{-4}} = \frac{3^{-4} \cdot 4^4}{4^4 \cdot 4^{-4}} = \frac{1 \cdot 4^4}{3^4} = \frac{2^8}{3^4} \\
 \left(\frac{3}{4}\right)^{-4} &= (3 \cdot 2^{-2})^{-4} = 3^{-4} \cdot 2^8 = \frac{2^8}{3^4} \\
 \left(\frac{3}{4}\right)^{-4} &= \left(\left(\frac{3}{4}\right)^{-1}\right)^4 = \left(\frac{4}{3}\right)^4 = \frac{4^4}{3^4} = \frac{2^8}{3^4}
 \end{aligned}$$

11 5-9:06

$a, b \in \mathbb{R}$
 $a, b \neq 0$

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

$a, b, c \neq 0$

$$\begin{aligned}
 \frac{a^2 b}{c^3} : \frac{ab^2}{c^2} &= \frac{a^{\cancel{2}} b^{\cancel{1}}}{c^{\cancel{3}}} \cdot \frac{c^{\cancel{2}}}{a^{\cancel{1}} b^{\cancel{2}}} = \frac{a}{bc} \\
 &= a^{2-1} b^{1-2} c^{2-3} = a b^{-1} c^{-1} = \frac{a}{bc}
 \end{aligned}$$

11 5-9:16

$$\begin{aligned}
 & a, b, c \neq 0 \\
 & \frac{a^{-3} b^2}{c^{-3}} : \left(\frac{b^3 c}{a^2} \right)^2 = \frac{a^{-3} b^2}{c^{-3}} \cdot \left(\frac{a^2}{b^3 c} \right)^2 = \\
 & = \frac{a^{-3} b^2}{c^{-3}} \cdot \frac{a^4}{b^6 c^2} = a^{-3+4} b^{2-6} c^{3-2} \\
 & = \frac{a c}{b^4}
 \end{aligned}$$

11 5-9:22

$$\begin{aligned}
 & \frac{6^{3n-1} \cdot 9^{n-1} \cdot 10^{2n-1}}{30^{2n-4} \cdot 32^n \cdot 12^{1-n}} = \\
 & = \frac{2^{3n-1} \cdot 3^{3n-1} \cdot (3^{\frac{2n-2}{2}})^{2n-1} \cdot 2^{2n-1} \cdot 5^{2n-1}}{2^{2n-4} \cdot 3^{2n-4} \cdot 5^{2n-4} \cdot 2^{5n} \cdot 2^{2-2n} \cdot 3^{1-n}} = \\
 & = 2^{3n-1+2n-1-2n+4-5n-2+2n} \cdot 3^{3n-1+2n-2-2n+4-1+n} \cdot 5^{2n-1-2n+4} \\
 & = 2^0 \cdot 3^4 \cdot 5^3 = \underline{\underline{3^4 \cdot 5^3}}
 \end{aligned}$$

11 5-9:26

$$\frac{6^{3n-1} \cdot 9^{m-1} \cdot 10^{2n-1}}{30^{2n-4} \cdot 32^m \cdot 12^{1-m}} = 6^{3n-1} \cdot 6^{-1} \cdot 9^m \cdot 9^{-1}$$

atd DÚ

$$a^{x+y} = a^x \cdot a^y$$

11 5-9:34

$$129 / \begin{array}{l} 6 \cdot 12 \\ 6 \cdot 13 \end{array}$$

Pet: 62 co zbylo

! 43, 44, 45, 46

11 5-9:37