

Mocniny s celočíselným exponentem – příklady

Zadání

1) $5a^3b^{-2}$

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

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

4) $(a^{-4}b^3c^{-5}) : (a^{-2}b^{-4}c^{-2})$

5) $(4a^{-2})^{-3}$

6) $(3a^{-2}b^3)^{-1}$

7) $(3a^{-4}b^5)^{-3}$

8) $\left(\frac{2x^{-5}y^7}{3x^2y^{-3}}\right)^{-2}$

9) $(3x^{-2}y^3)^2 \cdot (2x^2y^{-4})^{-3}$

10) $\left(\frac{2y^{-3}}{x^5}\right)^{-3} \cdot \frac{4x^3}{y^{-4}}$

11) $\left(\frac{3x^{-2}}{2y^3}\right)^{-3} : \frac{2x^3}{y^{-4}}$

12) $\left(\frac{2m^{-2}n^6}{3m^4n^{-2}}\right)^{-2}$

13) $\left(\frac{2x^{-7}y^3}{3x^3y^{-2}}\right)^{-2}$

Řešení

$$1) \quad 5a^3b^{-2} = \frac{5a^3b^{-2}}{1} = \frac{5a^3}{b^2}$$

$$2) \quad (2x^{-5}y^3) \cdot (3x^8y^{-4}) = \frac{2x^{-5}y^3}{1} \cdot \frac{3x^8y^{-4}}{1} = \frac{2y^3}{x^5} \cdot \frac{3x^8}{y^4} = \frac{6x^8y^3}{x^5y^4} = \frac{6x^3}{y}$$

$$3) \quad (x^{-5}y^3z^{-6}) \cdot (x^3y^{-2}z^{-4}) = \frac{x^{-5}y^3z^{-6}}{1} \cdot \frac{x^3y^{-2}z^{-4}}{1} = \frac{y^3}{x^5z^6} \cdot \frac{x^3}{y^2z^4} = \frac{x^3y^3}{x^5y^2z^{10}} = \frac{y}{x^2z^{10}}$$

$$4) \quad (a^{-4}b^3c^{-5}) : (a^{-2}b^{-4}c^{-2}) = \frac{a^{-4}b^3c^{-5}}{a^{-2}b^{-4}c^{-2}} = \frac{b^3a^2b^4c^2}{a^4c^5} = \frac{b^7}{a^2c^3}$$

$$5) \quad (4a^{-2})^{-3} = \left(\frac{4}{a^2}\right)^{-3} = \left(\frac{a^2}{4}\right)^3 = \frac{a^6}{64}$$

$$6) \quad (3a^{-2}b^3)^{-1} = \left(\frac{3b^3}{a^2}\right)^{-1} = \left(\frac{a^2}{3b^3}\right)^1 = \frac{a^2}{3b^3}$$

$$7) \quad (3a^{-4}b^5)^{-3} = \left(\frac{3b^5}{a^4}\right)^{-3} = \left(\frac{a^4}{3b^5}\right)^3 = \frac{a^{12}}{27b^{15}}$$

$$8) \quad \left(\frac{2x^{-5}y^7}{3x^2y^3}\right)^{-2} = \left(\frac{2y^7y^3}{3x^2x^5}\right)^{-2} = \left(\frac{2y^{10}}{3x^7}\right)^{-2} = \left(\frac{3x^7}{2y^{10}}\right)^2 = \frac{9x^{14}}{4y^{20}}$$

$$9) \quad (3x^{-2}y^3)^2 \cdot (2x^2y^{-4})^{-3} = \left(\frac{3y^3}{x^2}\right)^2 \cdot \left(\frac{2x^2}{y^4}\right)^{-3} = \frac{9y^6}{x^4} \cdot \left(\frac{y^4}{2x^2}\right)^3 = \frac{9y^6}{x^4} \cdot \frac{y^{12}}{8x^6} = \frac{9y^{18}}{8x^{10}}$$

$$10) \quad \left(\frac{2y^{-3}}{x^5}\right)^{-3} \cdot \frac{4x^3}{y^{-4}} = \left(\frac{2}{x^5y^3}\right)^{-3} \cdot \frac{4x^3y^4}{1} = \left(\frac{x^5y^3}{2}\right)^3 \cdot \frac{4x^3y^4}{1} = \frac{x^{15}y^9}{8} \cdot \frac{4x^3y^4}{1} = \frac{x^{18}y^{13}}{2}$$

$$11) \quad \left(\frac{3x^{-2}}{2y^3}\right)^{-3} : \frac{2x^3}{y^{-4}} = \left(\frac{3}{2y^3x^2}\right)^{-3} : \frac{2x^3y^4}{1} = \left(\frac{2y^3x^2}{3}\right)^3 \cdot \frac{1}{2x^3y^4} = \frac{8y^9x^6}{27} \cdot \frac{1}{2x^3y^4} = \frac{4x^6y^9}{27x^3y^4} = \frac{4x^3y^5}{27}$$

$$12) \quad \left(\frac{2m^{-2}n^6}{3m^4n^{-2}}\right)^{-2} = \left(\frac{2n^6n^2}{3m^4m^2}\right)^{-2} = \left(\frac{3m^6}{2n^8}\right)^2 = \frac{9m^{12}}{4n^{16}}$$

$$13) \quad \left(\frac{2x^{-7}y^3}{3x^3y^{-2}}\right)^{-2} = \left(\frac{2y^3y^2}{3x^3x^7}\right)^{-2} = \left(\frac{3x^{10}}{2y^5}\right)^2 = \frac{9x^{20}}{4y^{10}}$$