

3. Stepen čiji je izložilac ceo broj

$$6^{\circ} \quad a^{-n} = \frac{1}{a^n}, \quad a \in R, a \neq 0, n \in N$$

Primer 1.

$$a) \quad 3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

$$b) \quad (-2)^{-3} = \frac{1}{(-2)^3} = \frac{1}{-8} = -\frac{1}{8}$$

$$c) \quad \left(\frac{4}{3}\right)^{-2} = \frac{1}{\left(\frac{4}{3}\right)^2} = \frac{1}{\frac{4^2}{3^2}} = \frac{3^2}{4^2} = \left(\frac{3}{4}\right)^2$$

$$d) \quad \frac{3^{-3}}{3^{-8}} = \frac{\frac{1}{3^3}}{\frac{1}{3^8}} = \frac{3^8}{3^3} = 3^5. \text{ Iz ovoga vidimo da ako stepenovani broj menja mesto u}$$

razlomku iz brojioca u imenioc ili obratno, onda njegov izložilac menja znak.

ZADATAK 1. Izračunaj

$$a) \quad (-2)^{-1} + (-3)^{-1}$$

$$b) \quad \frac{(-2)^{-3} - (-3)^{-2}}{(-4)^{-1}} \cdot \left(\frac{2}{3}\right)^{-3}$$

$$c) \quad 0,5^{-1} + 0,25^{-2} + 0,125^{-3}$$

$$d) \quad \frac{2^{-2} \cdot 5^3 \cdot 10^{-4}}{2^{-3} \cdot 5^2 \cdot 10^{-5}}$$

$$e) \quad \left(6 - 4 \cdot \left(\frac{5}{16}\right)^0\right)^{-2} + \left(\frac{2}{3}\right)^{-1} - \frac{4}{3}$$

$$f) \quad \frac{2^{-2} + 2^0}{\left(\frac{1}{2}\right)^{-2} - 5 \cdot (-2)^{-2} + \left(\frac{2}{3}\right)^{-2}}$$

Rešenje:

$$a) (-2)^{-1} + (-3)^{-1} = \frac{1}{-2} + \frac{1}{-3} = -\frac{1}{2} - \frac{1}{3} = \frac{-3-2}{6} = -\frac{5}{6}$$

$$b) \frac{(-2)^{-3} - (-3)^{-2}}{(-4)^{-1}} \cdot \left(\frac{2}{3}\right)^{-3} = \frac{\frac{1}{(-2)^3} - \frac{1}{(-3)^2}}{\frac{1}{-4}} \cdot \left(\frac{3}{2}\right)^3 = \frac{\frac{1}{-8} - \frac{1}{9}}{-4} \cdot \frac{27}{8} = \frac{\frac{-9-8}{72}}{-4} \cdot \frac{27}{8} =$$
$$= \frac{-\frac{17}{72}}{-4} \cdot \frac{27}{8} = \frac{17}{18} \cdot \frac{27}{8} = \frac{51}{16}$$

$$c) 0,5^{-1} + 0,25^{-2} + 0,125^{-3} = \left(\frac{1}{2}\right)^{-1} + \left(\frac{1}{4}\right)^{-2} + \left(\frac{1}{8}\right)^{-3} = 2 + 4^2 + 8^3 = 530$$

$$d) \frac{2^{-2} \cdot 5^3 \cdot 10^{-4}}{2^{-3} \cdot 5^2 \cdot 10^{-5}} = 2^{-2-(-3)} \cdot 5^{3-2} \cdot 10^{-4-(-5)} = 2 \cdot 5 \cdot 10 = 100$$

$$e) \left(6 - 4 \cdot \left(\frac{5}{16}\right)^0\right)^{-2} + \left(\frac{2}{3}\right)^{-1} - \frac{4}{3} = 2^{-2} + \frac{3}{2} - \frac{4}{3} = \frac{1}{2} + \frac{3}{2} - \frac{4}{3} = \frac{3+9-8}{6} = \frac{2}{3}$$

$$f) \frac{2^{-2} + 2^0}{\left(\frac{1}{2}\right)^{-2} - 5 \cdot (-2)^{-2} + \left(\frac{2}{3}\right)^{-2}} = \frac{\frac{1}{2^2} + 1}{2^2 - 5 \cdot \left(-\frac{1}{2}\right)^2 + \left(\frac{3}{2}\right)^2} = \frac{\frac{5}{4}}{4 - \frac{5}{4} + \frac{9}{4}} = \frac{\frac{5}{4}}{\frac{20}{4}} = \frac{1}{4}$$

ZADATAK 2. Uprosti izraze:

$$a) x^3 \cdot x^2 \cdot x^{-6}$$

$$b) a^3 : a^{-2}$$

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

$$d) \frac{2a^2}{5b^{-2}} : \frac{10a^{-3}}{6b^{-1}}$$

$$e) \left(\frac{b^0 a^{-2}}{b^{-3}}\right)^6 \cdot \left(\frac{a^{-3} b^{-1}}{b^{12}}\right)^{-3}$$

Rešenje:

$$a) x^3 \cdot x^2 \cdot x^{-6} = x^{3+2+(-6)} = x^{-1} = \frac{1}{x}$$

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

$$c) (a^3 b^{-4}) : (a^{-3} b^4) = a^{3-(-3)} b^{-4-4} = a^6 b^{-8} = \frac{a^6}{b^8}$$

$$d) \frac{2a^2}{5b^{-2}} : \frac{10a^{-3}}{6b^{-1}} = \frac{2a^2}{5b^{-2}} \cdot \frac{6b^{-1}}{10a^{-3}} = \frac{6}{25} a^{2-(-3)} b^{-1-(-2)} = \frac{6}{25} a^5 b$$

$$e) \left(\frac{b^0 a^{-2}}{b^{-3}} \right)^6 \cdot \left(\frac{a^{-3} b^{-1}}{b^{12}} \right)^{-3} = \frac{a^{-12}}{b^{-18}} \cdot \frac{a^9 b^3}{b^{-36}} = a^{-12+9} b^{3-(-18)-(-36)} = a^{-3} b^{57} = \frac{b^{57}}{a^3}$$