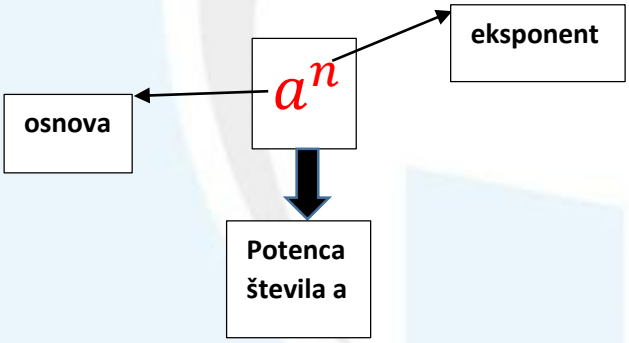
POTENCE IN KORENI

I. POTENCE



a.) **Ničla v eksponentu:**

$$a^0 = 1$$

1. Izračunaj potence:

$7^0 = 1$

$\left(\frac{2}{3}\right)^0 = 1$

$(-7)^0 = 1$

$-7^0 = -1$

b.) Minus v eksponentu:

$$a^{-n} = \frac{1}{a^n}$$

2. Izračunaj potence:

$7^{-2} = \frac{1}{7^2} = \frac{1}{49}$

$\left(\frac{2}{3}\right)^{-3} = \left(\frac{3}{2}\right)^3 = \frac{27}{8} = 3\frac{3}{8}$

$\frac{2^3}{3} = \frac{8}{3} = 2\frac{2}{3}$

PRAVILA:

a.) ENAKE OSNOVE

$$a^n \cdot a^m = a^{n+m}$$

$$\frac{a^n}{a^m} = a^{n-m}$$

$$(a^n)^m = a^{n \cdot m}$$

3. Izračunaj potence:

$2^3 \cdot 2^2 = 2^{3+2} = 2^5 = 32$

$3^2 \cdot 3^4 \cdot 3^{-2} \cdot 3 = 3^{2+4-2+1} = 3^5 = 243$

$\frac{5^7}{5^5} = 5^{7-5} = 5^2 = 25$

$2^8 : 2^5 = 2^{8-5} = 2^3 = 8$

$2^4 \cdot 2^5 : 2^3 \cdot 2 : 2^{-6} : 2^7 : 8 = 2^{4+5-3+1-(-6)-7-3} = 2^{4+5-3+1+6-7-3} = 2^3 = 8$

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

$(2^3)^{-2} = 2^{3 \cdot (-2)} = 2^{-6} = \frac{1}{2^6} = \frac{1}{64}$

b.) ENAK EKSPONENT

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

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

4. Izračunaj potenci:

$2^3 \cdot 5^3 = (2 \cdot 5)^3 = 10^3 = 1000$

$\frac{15^3}{5^3} = \left(\frac{15}{5}\right)^3 = 3^3 = 27$

5. Skrči izraz in izračunaj

$(2^{n+2})^{n-2} \cdot 2^{(n-1)^2} : 4^{n \cdot (n-1)} = 2^{(n+2) \cdot (n-2)} \cdot 2^{n^2-2n+1} : 2^{2 \cdot (n^2-n)} =$

$2^{n^2-4} \cdot 2^{n^2-2n+1} : 2^{2n^2-2n} = 2^{n^2-4+n^2-2n+1-2n^2+2n} = 2^{-3} = \frac{1}{8}$

6. Poenostavi izraz

$$\left(\frac{2\cdot a^7\cdot b^{-8}\cdot c^3}{a^{-2}\cdot b^{-4}}\right)^{-3}\cdot\left(\frac{a^{-3}\cdot b^3}{2\cdot a^4\cdot c^2}\right)^{-4}=\left(\frac{a^{-2}\cdot b^{-4}}{2\cdot a^7\cdot b^{-8}\cdot c^3}\right)^{3}\cdot\left(\frac{2\cdot a^4\cdot c^2}{a^{-3}\cdot b^3}\right)^{4}=$$

$$=\frac{a^{-6}\cdot b^{-12}}{2^3\cdot a^{21}\cdot b^{-24}\cdot c^9}\cdot\frac{2^4\cdot a^{16}\cdot c^8}{a^{-12}\cdot b^{12}}=\frac{b^{24}\cdot 2^4\cdot a^{16}\cdot c^8\cdot a^{12}}{2^3\cdot a^{21}\cdot a^6\cdot b^{12}\cdot c^9\cdot b^{12}}=$$

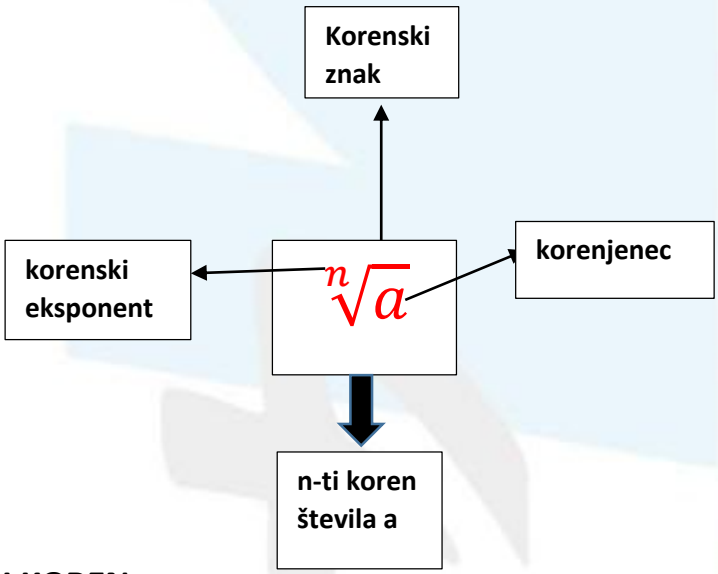
$$=\frac{2^4\cdot a^{28}\cdot b^{24}\cdot c^8}{2^3\cdot a^{27}\cdot b^{24}\cdot c^9}=\frac{2\cdot a}{c}$$

7. Izpostavi skupni faktor

$$3^{x+3}-8\cdot 3^{x+1}-6\cdot 3^{x-1}=3^{x-1}\cdot(3^4-8\cdot 3^2-6\cdot 1)=$$

$$=3^{x-1}\cdot(81-72-6)=3^{x-1}\cdot 3=3^x$$

I. KORENI



a.) KVADRATNI KOREN

$$\left(\sqrt{a}\right)^2=\sqrt{a^2}=a \quad\Rightarrow\quad \sqrt{a}\cdot\sqrt{a}=a$$

$$\sqrt{a\cdot b}=\sqrt{a}\cdot\sqrt{b}$$

$$\sqrt{\frac{a}{b}}=\frac{\sqrt{a}}{\sqrt{b}}$$

8. Izračunaj

$$\left(\sqrt{25}\right)^2 = \sqrt{25^2} = 25$$

$$\sqrt{81 \cdot 36} = \sqrt{81} \cdot \sqrt{36} = 9 \cdot 6 = 54$$

$$\sqrt{\frac{100}{64}} = \frac{\sqrt{100}}{\sqrt{64}} = \frac{10}{8} = \frac{5}{4} = 1\frac{1}{4}$$

$$\sqrt{12\frac{1}{4}} = \sqrt{\frac{49}{4}} = \frac{\sqrt{49}}{\sqrt{4}} = \frac{7}{2} = 3\frac{1}{2}$$

$$\sqrt{\frac{56}{27}} \cdot \sqrt{\frac{21}{2}} = \frac{\sqrt{8} \cdot \sqrt{7}}{\sqrt{9} \cdot \sqrt{3}} \cdot \frac{\sqrt{7} \cdot \sqrt{3}}{\sqrt{2}} = \frac{\sqrt{4} \cdot \sqrt{2} \cdot 7 \cdot \sqrt{3}}{3 \cdot \sqrt{3} \cdot \sqrt{2}} = \frac{2 \cdot 7}{3} = \frac{14}{3} = 4\frac{2}{3}$$

9. Delno koreni

$$\sqrt{50} = \sqrt{25 \cdot 2} = \sqrt{25} \cdot \sqrt{2} = 5\sqrt{2}$$

$$\sqrt{\frac{125}{16}} = \frac{\sqrt{25} \cdot \sqrt{5}}{\sqrt{16}} = \frac{5\sqrt{5}}{4}$$

10. Racionaliziraj imenovalec

$$\frac{\sqrt{8} - 2}{\sqrt{2}} = \frac{(\sqrt{8} - 2) \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{\sqrt{16} - 2\sqrt{2}}{2} = \frac{4 - 2\sqrt{2}}{2} = \frac{2 \cdot (2 - \sqrt{2})}{2} = 2 - \sqrt{2}$$

$$\frac{\sqrt{5}}{\sqrt{5} + 1} = \frac{\sqrt{5} \cdot (\sqrt{5} - 1)}{(\sqrt{5} + 1) \cdot (\sqrt{5} - 1)} = \frac{\sqrt{25} - \sqrt{5}}{\sqrt{25} - 1} = \frac{5 - \sqrt{5}}{4}$$

b.) KORENI POLJUBNIH STOPENJ

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{a \cdot b}$$

$$\sqrt[n]{a} : \sqrt[n]{b} = \sqrt[n]{a : b}$$

$$\left(\sqrt[m]{a}\right)^n = \sqrt[m]{a^n} \quad \Rightarrow \quad \sqrt[m]{a^n} = a^{\frac{n}{m}}$$

$$\sqrt[m]{\sqrt[n]{a}} = \sqrt[m \cdot n]{a}$$

11. Izračunaj

$$\sqrt[3]{4} \cdot \sqrt[3]{16} = \sqrt[3]{4 \cdot 16} = \sqrt[3]{64} = \sqrt[3]{4^3} = 4^{\frac{3}{3}} = 4$$

$$\sqrt[5]{192} : \sqrt[5]{6} = \sqrt[5]{192 : 6} = \sqrt[5]{32} = \sqrt[5]{2^5} = 2$$

12. Poenostavi

$$\sqrt[3]{27 \cdot a^{15} \cdot b^{-12}} = \sqrt[3]{3^3} \cdot \sqrt[3]{a^{15}} \cdot \sqrt[3]{b^{-12}} = 3^{\frac{3}{3}} \cdot a^{\frac{15}{3}} \cdot b^{\frac{-12}{3}} = 3a^5b^{-4}$$

$$\sqrt[5]{x^{-3} \cdot y^6} \cdot \sqrt[5]{x^{-2} \cdot y^4} = \sqrt[5]{x^{-3} \cdot y^6 \cdot x^{-2} \cdot y^4} = \sqrt[5]{x^{-5} \cdot y^{10}} = x^{-1} \cdot y^2$$

$$\sqrt[5]{x^6 \cdot \sqrt[3]{x^{12}}} = \sqrt[15]{x^{6 \cdot 3} \cdot x^{12}} = \sqrt[15]{x^{18} \cdot x^{12}} = \sqrt[15]{x^{30}} = x^{\frac{30}{15}} = x^2$$

$$\frac{\sqrt[3]{(x^2 \cdot y)^5} \cdot \sqrt{x \cdot y^5}}{\sqrt[6]{(x^5 \cdot y)^{-5}}} = \frac{\sqrt[6]{x^{10 \cdot 2} \cdot y^{5 \cdot 2} \cdot x^{1 \cdot 3} \cdot y^{5 \cdot 3}}}{\sqrt[6]{x^{-25} \cdot y^{-5}}} = \sqrt[6]{\frac{x^{20+3} \cdot y^{10+15}}{x^{-25} \cdot y^{-5}}} =$$

$$= \sqrt[6]{x^{23} \cdot y^{25} \cdot x^{25} \cdot y^5} = \sqrt[6]{x^{48} \cdot y^{30}} = x^{\frac{48}{6}} \cdot y^{\frac{30}{6}} = x^8 \cdot y^5$$

13. Izračunaj

$$\sqrt{12 \cdot \left(\frac{1}{27}\right)^{-\frac{1}{3}} - 5 \cdot \left(\frac{1}{32}\right)^{-\frac{2}{5}}} = \sqrt{12 \cdot \left(\frac{27}{1}\right)^{\frac{1}{3}} - 5 \cdot \left(\frac{32}{1}\right)^{\frac{2}{5}}} =$$

$$= \sqrt{12 \cdot \sqrt[3]{27} - 5\sqrt[5]{32^2}} = \sqrt{12 \cdot 3 - 5\sqrt[5]{(2^5)^2}} = \sqrt{36 - 5 \cdot 2^{\frac{10}{5}}} =$$

$$= \sqrt{36 - 5 \cdot 4} = \sqrt{36 - 20} = \sqrt{16} = 4$$