15.2 Potence z racionalnimi eksponenti

Potenca z racionalnim eksponentom je definirana kot:

$$x^{\frac{m}{n}} = \sqrt[n]{x^m},$$

kjer je $m \in \mathbb{Z}$, $n \in \mathbb{N}$ in $a \in [0, \infty)$.

Pravila za računanje s potencami s celimi eksponenti

- $x^p \cdot x^q = x^{p+q}$
- $x^p \cdot y^p = (xy)^p$
- $(x^p)^q = x^{pq}$
- $x^p : x^q = \dfrac{x^p}{x^q} = x^{p-q}; \quad x \neq 0$
- $x^p : y^p = \dfrac{x^p}{y^p} = \left(\dfrac{x}{y}\right)^p; \quad y \neq 0$

V pravilih upoštevamo primerni realni osnovi $x, y \in \mathbb{R}$ in racionalne eksponente $p, q \in \mathbb{Q}$.

Naloga 15.8. *Izračunajte.*

- $8^{\frac{1}{3}} - 16^{\frac{2}{4}}$
- $27^{\frac{2}{3}} - 125^{\frac{1}{3}}$
- $(-8)^{-\frac{1}{3}}$
- $1000^{\frac{2}{3}} - 343^{\frac{2}{3}}$

Naloga 15.9. *Izračunajte.*

- $\sqrt{625^{\frac{3}{4}} - \left(\dfrac{1}{2}\right)^{-2} + 4^{\frac{1}{3}} \cdot 16^{\frac{1}{3}}}$
- $4 \cdot 0.16^{-\frac{1}{2}} - \sqrt[3]{5 \cdot 8^{\frac{1}{3}} + 2 \cdot 81^{\frac{3}{4}}}$
- $\left(2 \cdot 9^{\frac{3}{2}} + 5 \cdot 16^{\frac{1}{4}}\right)^{\frac{1}{3}}$
- $\left(\left(\dfrac{4}{9}\right)^{-\frac{1}{2}} \cdot 32^{\frac{1}{5}} + 169^{\frac{1}{2}}\right)^{\frac{1}{2}}$
- $0.25^{-\frac{1}{2}} \cdot 0.001^{-\frac{1}{3}} - \sqrt[3]{10^2 + 0.2^{-2}}$
- $\left(3\dfrac{3}{8}\right)^{\frac{2}{3}} \cdot \left(\dfrac{1}{4}\right)^{-\frac{1}{2}} \cdot \left(3 - \sqrt{5}\right)\sqrt{7 + 3\sqrt{5}}$

Naloga 15.10. *Izračunajte.*

- $2.25^{-0.5} \cdot \sqrt{4^{1.5} + 1}$
- $6.25^{-0.5} \cdot 2.25^{1.5} + \sqrt{16^{0.75} + 1}$
- $\left(3\dfrac{1}{16}\right)^{-0.5} \sqrt{0.125^{-\frac{2}{3}} + 3}^{\,4} + 0.002^{-\frac{2}{3}}$
- $\sqrt{10}\left(5^{-0.5} - 2\right)^{-1} - \sqrt{90}$
- $\sqrt{27^{\frac{2}{3}} + 0.25^{-2}} + \left(2 - \sqrt{5}\right)\sqrt{9 + 4\sqrt{5}} - \dfrac{1 + \sqrt{12}}{2 + \sqrt{3}}$

Naloga 15.11. *Izraz zapišite s potencami in ga poenostavite.*

- $\left(\dfrac{1 - z}{1 - \sqrt[3]{z}} - \sqrt[3]{z}\right)\left(1 - \sqrt[6]{z^4}\right)$
- $\dfrac{\sqrt[6]{ab^3\sqrt{a^3 b}}}{\sqrt[4]{b^{-3}\sqrt[3]{a}}}$
- $\left(y^{\frac{2}{3}} x^{-0.25}\right)^6 : \left(\sqrt{x^{-4}y^2} \cdot \sqrt{y\sqrt[3]{xy^{-3}}}\right)^3$
- $\dfrac{\sqrt[3]{x^{-4}\sqrt{x^2 y^{-3}}}}{\sqrt[4]{x^{-3}y^2}} \cdot \left(x^{0.3}y^{0.2}\right)^5$
- $\dfrac{\sqrt[5]{x^{-2}\sqrt[3]{x^{-3}y^4}}}{y^{-\frac{1}{3}}x^{\frac{1}{2}}} \left(\sqrt[6]{\sqrt{y^{-3}}}\right)^4$
- $\dfrac{\sqrt[4]{x^{-2}y}}{\sqrt[6]{x^3\sqrt{y^{-7}}}} \sqrt[4]{x^2 y^{-5}}^{\,2}$