

Cv. 7.:

1)  $\sqrt{3} \cdot \sqrt{3^5}$

7)  $^{10}\sqrt{2} \cdot \sqrt[3]{4} \cdot \sqrt{2^3}$

13)  $\sqrt[5]{7^4 \cdot \sqrt[3]{7^2}} \cdot \sqrt[15]{7}$

2)  $\sqrt[3]{5} \cdot \sqrt{5^3} \cdot \sqrt[6]{5}$

8)  $\frac{\sqrt[3]{25} \cdot \sqrt{5^5}}{\sqrt[6]{5}}$

14)  $\sqrt[3]{25} \cdot \sqrt{5^5} \cdot \sqrt{5}$

3)  $\frac{\sqrt[4]{7} \cdot \sqrt{7^3}}{\sqrt[4]{7^3}}$

9)  $\frac{\sqrt[3]{4} \cdot \sqrt{8}}{\sqrt[6]{2}}$

15)  $\frac{\sqrt{5} \cdot \sqrt[3]{5}}{\sqrt[3]{5} \cdot \sqrt{5}}$

4)  $\frac{\sqrt{3} \cdot \sqrt[3]{3} \cdot \sqrt[4]{3}}{\sqrt[12]{3}}$

10)  $\frac{\sqrt{27} \cdot \sqrt[3]{9}}{\sqrt[6]{3}}$

16)  $\frac{\sqrt{2} \cdot \sqrt[3]{4}}{\sqrt[3]{2} \cdot \sqrt[4]{4}}$

5)  $\frac{\sqrt[4]{5} \cdot \sqrt[3]{5^2} \cdot \sqrt{5}}{\sqrt[12]{5^{11}}}$

11)  $\frac{\sqrt{15} \cdot \sqrt[3]{25} \cdot 3}{\sqrt{3^3} \cdot \sqrt[3]{5}}$

17)  $\frac{\sqrt{2^3} \cdot \sqrt{2^3}}{\sqrt[4]{2} \cdot \sqrt[8]{2}}$

6)  $\sqrt{8} \cdot \sqrt{2}$

12)  $\sqrt[3]{5} \cdot \sqrt{5^3} \cdot \sqrt[6]{5}$

18)  $\frac{\sqrt{2} \cdot \sqrt[3]{2}}{\sqrt[3]{4} \cdot \sqrt{2}}$

## Mocniny 2

### Mocniny s racionálním exponentem

**Definice**  $a^{\frac{p}{q}} = \sqrt[q]{a^p}$

**Příklad:**

$$9^{\frac{1}{2}} = \sqrt{9^1} = \sqrt{9} = 3$$

$$16^{\frac{1}{4}} = \sqrt[4]{16^1} = \sqrt[4]{16} = 2$$

$$27^{\frac{2}{3}} = \sqrt[3]{27^2} = \sqrt[3]{729} = 9 \quad \text{nebo} \quad 27^{\frac{2}{3}} = (\sqrt[3]{27})^2 = 3^2 = 9$$

**Cv. 1.:**

1)  $25^{\frac{1}{2}} =$

3)  $8^{\frac{1}{3}} =$

5)  $8^{\frac{2}{3}} =$

7)  $81^{\frac{3}{4}} =$

2)  $49^{\frac{1}{2}} =$

4)  $27^{\frac{1}{3}} =$

6)  $16^{\frac{3}{4}} =$

8)  $32^{\frac{2}{5}} =$

**Odmocňování zlomků**

$$\sqrt{\frac{p}{q}} = \frac{\sqrt{p}}{\sqrt{q}}$$

**Příklad:**

$$\left(\frac{4}{25}\right)^{\frac{1}{2}} = \sqrt{\frac{4}{25}} = \frac{\sqrt{4}}{\sqrt{25}} = \frac{2}{5}$$

$$\left(\frac{8}{27}\right)^{\frac{1}{3}} = \sqrt[3]{\frac{8}{27}} = \frac{\sqrt[3]{8}}{\sqrt[3]{27}} = \frac{2}{3}$$

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**Cv. 2.:**

$$1) \left(\frac{1}{4}\right)^{\frac{1}{2}} = \quad 3) \left(\frac{4}{9}\right)^{\frac{1}{2}} = \quad 5) \left(\frac{25}{81}\right)^{\frac{1}{2}} = \quad 7) \left(\frac{16}{81}\right)^{\frac{3}{4}} =$$
$$2) \left(\frac{1}{27}\right)^{\frac{1}{3}} = \quad 4) \left(\frac{9}{16}\right)^{\frac{1}{2}} = \quad 6) \left(\frac{8}{27}\right)^{\frac{2}{3}} = \quad 8) \left(\frac{27}{64}\right)^{\frac{2}{3}} =$$

**Cv. 3.:**

$$1) 25^{-\frac{1}{2}} = \quad 3) 27^{-\frac{1}{3}} = \quad 5) \left(\frac{1}{25}\right)^{-\frac{1}{2}} = \quad 7) \left(\frac{9}{16}\right)^{-\frac{1}{2}} =$$
$$2) 64^{-\frac{1}{2}} = \quad 4) 64^{-\frac{1}{3}} = \quad 6) \left(\frac{1}{16}\right)^{-\frac{1}{4}} = \quad 8) \left(\frac{16}{81}\right)^{-\frac{3}{4}} =$$

**Cv. 4.:**

$$1) 25^{\frac{1}{2}} - 8^{\frac{2}{3}} = \quad 5) 64^{-\frac{1}{2}} + \left(\frac{27}{8}\right)^{\frac{2}{3}} \cdot \frac{1}{2} =$$
$$2) 81^{\frac{3}{4}} + 1^{\frac{1}{3}} - 125^{\frac{2}{3}} = \quad 6) \left(\frac{1}{8}\right)^{-\frac{1}{3}} + \left(\frac{1}{81}\right)^{-\frac{1}{4}} =$$
$$3) \left(\frac{1}{16}\right)^{\frac{1}{4}} + \left(\frac{1}{8}\right)^{\frac{1}{3}} = \quad 7) \left(\frac{1}{8}\right)^{-\frac{1}{3}} + 2 \cdot (-1)^{30} =$$
$$4) \left(\frac{27}{64}\right)^{\frac{1}{3}} - \left(\frac{1}{64}\right)^{\frac{1}{2}} \cdot 8^{\frac{1}{3}} = \quad 8) \left[25^{-\frac{1}{2}} + \left(\frac{5}{4}\right)^{-1}\right] \cdot \left(\frac{1}{2}\right)^{-3} =$$

**Cv. 5.:**

$$1) 64^{\frac{1}{2}} - 16^{\frac{3}{4}} = \quad 4) \left(\frac{1}{27}\right)^{-\frac{1}{3}} + \left(\frac{1}{81}\right)^{-\frac{1}{4}} =$$

$$2) 27^{\frac{2}{3}} + (-1)^{58} + 1000^{\frac{1}{3}} = \quad 5) \left(\frac{16}{81}\right)^{-\frac{1}{2}} - 2^{-2} =$$
$$3) \left(\frac{1}{25}\right)^{\frac{1}{2}} + \left(\frac{1}{1000}\right)^{\frac{1}{3}} = \quad 6) \left(27^{-\frac{1}{3}} \cdot \frac{1}{2} + \left(\frac{1}{1296}\right)^{\frac{1}{4}}\right) \cdot 12 =$$

### Vzorce pro mocniny

Vzorec	Příklad
$a^n \cdot a^m = a^{n+m}$	$2^2 \cdot 2^3 = 2^{2+3} = 2^5$
$\frac{a^n}{a^m} = a^{n-m}$	$\frac{2^5}{2^2} = 2^{5-2} = 2^3$
$(a^n)^m = a^{n \cdot m}$	$(2^3)^2 = 2^{3 \cdot 2} = 2^6$
$(a \cdot b)^n = a^n \cdot b^n$	$(3 \cdot 5)^2 = 3^2 \cdot 5^2$

**Cv. 6.:**

$$1) \frac{5^{300} \cdot 5^{100}}{5^{398}} = \quad 3) \frac{6^{150}}{2^{149} \cdot 3^{150}} =$$
$$2) \frac{4^{150} \cdot 2^{100}}{2^{200} \cdot 2^{190}} = \quad 4) \frac{6^{200}}{2^{201}} \cdot 9^{-100} =$$

**Příklad:**

$$\sqrt{5^7} \cdot \sqrt{5} =$$

Odmocniny převedeme na mocniny s racionálním exponentem.

$$\sqrt{5^7} \cdot \sqrt{5} = 5^{\frac{7}{2}} \cdot 5^{\frac{1}{2}} = 5^{\frac{7+1}{2}} = 5^{\frac{8}{2}} = 5^4 = 625$$