

## SEMPLIFICAZIONE DI RADICALI IN $\mathbb{R}_0^+$

1.  $\sqrt[4]{\frac{25}{16}} = \left(\frac{5}{4}\right)^{2 \cdot \frac{1}{4}} = \sqrt{\frac{5}{4}}$        $\sqrt[6]{\frac{125}{27}} = \left(\frac{5}{3}\right)^{3 \cdot \frac{1}{6}} = \sqrt{\frac{5}{3}}$
2.  $\sqrt[4]{5^2 - 4^2} = \sqrt[4]{9} = 3^{2 \cdot \frac{1}{4}} = \sqrt{3}$        $\sqrt[12]{12^2 + 5^2} = \sqrt[12]{169} = 13^{2 \cdot \frac{1}{12}} = \sqrt[6]{13}$
3.  $\sqrt[8]{\frac{1}{16}} = \left(\frac{1}{2}\right)^{4 \cdot \frac{1}{8}} = \sqrt{\frac{1}{2}}$        $\sqrt[4]{\frac{81}{16}} = \left(\frac{3}{2}\right)^{4 \cdot \frac{1}{4}} = \frac{3}{2}$        $\sqrt[6]{\frac{8}{27}} = \left(\frac{2}{3}\right)^{3 \cdot \frac{1}{6}} = \sqrt{\frac{2}{3}}$
4.  $\sqrt[3]{0,008} = 0,2^{3 \cdot \frac{1}{3}} = 0,2$        $\sqrt[6]{0,04} = 0,2^{2 \cdot \frac{1}{6}} = \sqrt[3]{0,2}$        $\sqrt[8]{0,01} = 0,1^{2 \cdot \frac{1}{8}} = \sqrt[4]{0,1}$
5.  $\sqrt[4]{\left(2 - \frac{2}{9}\right)^2} = \sqrt[4]{\left(\frac{16}{9}\right)^2} = \left(\frac{4}{3}\right)^{4 \cdot \frac{1}{4}} = \frac{4}{3}$        $\sqrt[6]{3 + \frac{1}{4} + \frac{1}{8}} = \sqrt[6]{\frac{27}{8}} = \left(\frac{3}{2}\right)^{3 \cdot \frac{1}{6}} = \sqrt{\frac{3}{2}}$
6.  $\sqrt[6]{\frac{1}{5} \left(1 - \frac{6}{5} + \frac{6}{25}\right)} = \sqrt[6]{\frac{1}{5} \left(\frac{1}{25}\right)} = \sqrt[6]{\frac{1}{125}} = \left(\frac{1}{5}\right)^{3 \cdot \frac{1}{6}} = \sqrt{\frac{1}{5}}$
7.  $\sqrt[12]{\left(1 + \frac{1}{2}\right) \left(2 + \frac{1}{4}\right)} = \sqrt[12]{\frac{3}{2} \cdot \frac{9}{4}} = \sqrt[12]{\frac{27}{8}} = \left(\frac{3}{2}\right)^{3 \cdot \frac{1}{12}} = \sqrt[4]{\frac{3}{2}}$
8.  $\sqrt[4]{2^4 \cdot 5^8} = 2^{\frac{4}{4}} \cdot 5^{\frac{8}{4}} = 2 \cdot 5^2 = 50$        $\sqrt[3]{2^9 \cdot 3^6} = 2^{\frac{9}{3}} \cdot 3^{\frac{6}{3}} = 2^3 \cdot 3^2 = 72$
9.  $\sqrt[6]{9a^4} = 3^{\frac{2}{6}} a^{\frac{4}{6}} = 3^{\frac{1}{3}} a^{\frac{2}{3}} = \sqrt[3]{3a^2}$        $\sqrt[9]{27a^3} = 3^{\frac{3}{9}} a^{\frac{3}{9}} = 3^{\frac{1}{3}} a^{\frac{1}{3}} = \sqrt[3]{3a}$
10.  $\sqrt[6]{36x^4y^6z^2} = 6^{\frac{2}{6}} x^{\frac{4}{6}} y^{\frac{6}{6}} z^{\frac{2}{6}} = 6^{\frac{1}{3}} x^{\frac{2}{3}} y z^{\frac{1}{3}} = y \sqrt[3]{6x^2z}$
11.  $\sqrt[4]{0,09x^4(x-y)^8} = 0,3^{\frac{2}{4}} x^{\frac{4}{4}} (x-y)^{\frac{8}{4}} = x(x-y)^2 \sqrt{0,3}$
12.  $\sqrt[6]{0,008a^3b^{15}} = 0,2^{\frac{3}{6}} a^{\frac{3}{6}} b^{\frac{15}{6}} = 0,2^{\frac{1}{2}} a^{\frac{1}{2}} b^{\frac{5}{2}} = \sqrt{0,2ab^5}$
13.  $\sqrt[6]{9x^4y^8} = 3^{\frac{2}{6}} x^{\frac{4}{6}} y^{\frac{8}{6}} = 3^{\frac{1}{3}} x^{\frac{2}{3}} y^{\frac{4}{3}} = \sqrt[3]{3x^2y^4}$        $\sqrt[3]{8a^6b^9} = 2^{\frac{3}{3}} a^{\frac{6}{3}} b^{\frac{9}{3}} = 2a^2b^3$
14.  $\sqrt[6]{4a^2(a^2b^2 + 1 - 2ab)^2} = 2^{\frac{2}{6}} a^{\frac{2}{6}} (ab - 1)^{\frac{4}{6}} = \sqrt[3]{2a(ab - 1)^2}$
15.  $\sqrt[4]{a^4 + a^2 + \frac{1}{4}} = \left(a^2 + \frac{1}{2}\right)^{\frac{2}{4}} = \sqrt{a^2 + \frac{1}{2}}$
16.  $\sqrt[4]{\frac{a^5 + 4a^3 + 4a}{a^3b^6}} = \sqrt[4]{\frac{a(a^4 + 4a^2 + 4)}{a^3b^6}} = \sqrt[4]{\frac{(a^2 + 2)^2}{a^2b^6}} = \frac{(a^2 + 2)^{\frac{2}{4}}}{a^{\frac{2}{4}} b^{\frac{6}{4}}} = \sqrt{\frac{a^2 + 2}{ab^3}}$
17.  $\sqrt[6]{\frac{81x^4y^{10}}{9x^4 + 6x^2 + 1}} = \frac{9^{\frac{2}{6}} x^{\frac{4}{6}} y^{\frac{10}{6}}}{(3x^2 + 1)^{\frac{2}{6}}} = \sqrt[3]{\frac{9x^2y^5}{3x^2 + 1}}$
18.  $\sqrt[8]{1 + \frac{2x^2 + 1}{x^4}} = \sqrt[8]{\frac{x^4 + 2x^2 + 1}{x^4}} = \frac{(x^2 + 1)^{\frac{2}{8}}}{x^{\frac{4}{8}}} = \frac{\sqrt{x^2 + 1}}{\sqrt{x}}$

$$19. \sqrt[9]{\frac{(1-x)^4}{(1-x^2)(x+1)^5}} = \sqrt[9]{\frac{(1-x)^4}{(1-x)(1+x)(x+1)^5}} = \sqrt[9]{\frac{(1-x)^3}{(x+1)^6}} = \frac{(1-x)^{\frac{3}{9}}}{(x+1)^{\frac{6}{9}}} = \sqrt[3]{\frac{1-x}{(1+x)^2}}$$

$$20. \sqrt[6b]{5^{4b} x^{12b} y^{2b}} = 5^{\frac{4b}{6b}} x^{\frac{12b}{6b}} y^{\frac{2b}{6b}} = x^2 \sqrt[3]{5^2 y}$$

$$21. \sqrt[n]{(a+2b)^{2n^2}} = (a+2b)^{\frac{2n^2}{n}} = (a+2b)^{2n}$$

$$22. a^2 + a \sqrt{m^{a^2-1} n^{2a+2}} = m^{\frac{(a-1)(a+1)}{a(a+1)}} n^{\frac{2(a+1)}{a(a+1)}} = \sqrt[a]{m^{a-1} n^2}$$

$$23. x-y \sqrt{\frac{2^{x^2+y^2}}{4^{xy}}} = x-y \sqrt{\frac{2^{x^2+y^2}}{2^{2xy}}} = x-y \sqrt{2^{x^2+y^2-2xy}} = 2^{\frac{(x-y)^2}{x-y}} = 2^{x-y}$$

$$24. x^2 - y^2 \sqrt{\frac{2^{x-y} a^{x^2}}{a^{2xy-y^2}}} = x^2 - y^2 \sqrt{2^{x-y} a^{x^2-2xy+y^2}} = 2^{\frac{x-y}{(x-y)(x+y)}} a^{\frac{(x-y)^2}{(x-y)(x+y)}} = x+y \sqrt{2 a^{x-y}}$$

$$25. \sqrt[n]{(x^4 + 2x^2 y^2 + y^4)^{n^2}} = (x^2 + y^2)^{\frac{2n^2}{n}} = (x^2 + y^2)^{2n}$$

$$26. x^{-1} \sqrt{\frac{a^{3x^2} a^2}{a^{2x^2} a^{2x+1}}} = x^{-1} \sqrt{a^{3x^2+2-2x^2-2x-1}} = x^{-1} \sqrt{a^{x^2-2x+1}} = a^{\frac{(x-1)^2}{x-1}} = a^{x-1}$$