

2.4 Roots

Bases: a, b

Powers (rational numbers): n, m

$a, b \geq 0$ for even roots ($n = 2k, k \in \mathbb{N}$)

$$91. \quad \sqrt[n]{ab} = \sqrt[n]{a} \sqrt[n]{b}$$

$$92. \quad \sqrt[n]{a} \sqrt[m]{b} = \sqrt[nm]{a^m b^n}$$

$$93. \quad \sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}, \quad b \neq 0$$

$$94. \quad \frac{\sqrt[n]{a}}{\sqrt[m]{b}} = \frac{\sqrt[nm]{a^m}}{\sqrt[nm]{b^n}} = \sqrt[nm]{\frac{a^m}{b^n}}, \quad b \neq 0.$$

$$95. \quad \left(\sqrt[n]{a^m}\right)^p = \sqrt[n]{a^{mp}}$$

$$96. \quad \left(\sqrt[n]{a}\right)^n = a$$

$$97. \quad \sqrt[n]{a^m} = \sqrt[np]{a^{mp}}$$

$$98. \quad \sqrt[n]{a^m} = a^{\frac{m}{n}}$$

$$99. \quad \sqrt[m]{\sqrt[n]{a}} = \sqrt[mn]{a}$$

$$100. \quad \left(\sqrt[n]{a}\right)^m = \sqrt[n]{a^m}$$

$$101. \quad \frac{1}{\sqrt[n]{a}} = \frac{\sqrt[n]{a^{n-1}}}{a}, \quad a \neq 0.$$

$$102. \quad \sqrt{a \pm \sqrt{b}} = \sqrt{\frac{a + \sqrt{a^2 - b}}{2}} \pm \sqrt{\frac{a - \sqrt{a^2 - b}}{2}}$$

$$103. \quad \frac{1}{\sqrt{a \pm \sqrt{b}}} = \frac{\sqrt{a \mp \sqrt{b}}}{a - b}$$