# ⊗ Radicals

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| Multiplication | $\sqrt[n]{x} \times \sqrt[n]{y} = \sqrt[n]{x \times y}$ | ex : $\sqrt[3]{2} \times \sqrt[3]{5} = \sqrt[3]{2 \times 5} \Leftrightarrow \sqrt[3]{10}$ |
| Division | $\sqrt[n]{x} \div \sqrt[n]{y} = \sqrt[n]{\dfrac{x}{y}}$ | ex : $\sqrt[4]{8} \div \sqrt[4]{3} = \sqrt[4]{\dfrac{8}{3}}$ |
| Addition | $a\sqrt[n]{x} \pm b\sqrt[n]{x} = (a \pm b)\sqrt[n]{x}$ | ex : $4\sqrt[3]{5} - 2\sqrt[3]{5} = (4 - 2)\sqrt[3]{5} \Leftrightarrow 2\sqrt[3]{5}$ |
| Exponents | $\left(\sqrt[n]{x}\right)^p = \sqrt[n]{x^p}$ | ex : $\left(\sqrt{2}\right)^3 = \sqrt{2^3} \Leftrightarrow \sqrt{8}$ |
| Radicals | $\sqrt[n]{\sqrt[p]{x}} = \sqrt[n \cdot p]{x}$ | ex : $\sqrt[3]{\sqrt{5}} = \sqrt[3 \times 2]{5} \Leftrightarrow \sqrt[6]{5}$ |
| Exponentiation | $\sqrt[n]{a^m} = a^{\frac{m}{n}}$ | ex : $\sqrt[3]{4^5} = 4^{\frac{5}{3}}$ |
| Simplifying Radicals | $\left(\sqrt[n]{a}\right)^n = a$ | ex : $\left(\sqrt{3}\right)^2 = 3$ |
| | $\left(\sqrt[n]{a}\right)^m = \sqrt[n]{a^m}$ | ex : $\left(\sqrt{4}\right)^5 = \sqrt{4^5}$ |