

Simplifying, Multiplying and Dividing Radicals Video Lecture

Sections 10.1 and 10.3

Course Learning Objective:

Demonstrate appropriate manipulation of radicals.

Weekly Learning Objectives:

- 1) Find square roots, cube roots, fourth roots and fifth roots.**
- 2) Find n th roots.**
- 3) Find the n th root of a^n where a is a real number.**
- 4) Use the product and quotient rule for radicals.**
- 5) Simplify radicals.**

Simplifying, Multiplying and Dividing Radicals

Perfect Squares

$$\begin{aligned}1^2 &= 1 \\2^2 &= 4 \\3^2 &= 9 \\4^2 &= 16 \\5^2 &= 25 \\6^2 &= 36 \\7^2 &= 49 \\8^2 &= 64 \\9^2 &= 81 \\10^2 &= 100 \\11^2 &= 121 \\12^2 &= 144 \\13^2 &= 169 \\14^2 &= 196 \\15^2 &= 225\end{aligned}$$

Perfect Cubes

$$\begin{aligned}1^3 &= 1 \\2^3 &= 8 \\3^3 &= 27 \\4^3 &= 64 \\5^3 &= 125\end{aligned}$$

Perfect Fourths

$$\begin{aligned}1^4 &= 1 \\2^4 &= 16 \\3^4 &= 81 \\4^4 &= 256\end{aligned}$$

Perfect Fifths

$$\begin{aligned}1^5 &= 1 \\2^5 &= 32 \\3^5 &= 243\end{aligned}$$

$$\sqrt[5]{32} =$$

$$\sqrt[4]{256} =$$

$$\sqrt[3]{8} =$$

$$\sqrt[3]{-27} =$$

$$\sqrt[4]{-81} =$$

$$-\sqrt{36} =$$

$$-\sqrt{-100} =$$

$$\sqrt{\frac{4}{9}} =$$

$$-\sqrt{43} =$$

$$\sqrt[3]{12} =$$

$$\sqrt{x^2}$$

$$\sqrt[3]{x^3}$$

$$\sqrt[4]{x^4}$$

$$\sqrt[5]{x^5}$$

$$\sqrt{x^3}$$

$$\sqrt[3]{x^6}$$

$$\sqrt[4]{x^{16}}$$

$$\sqrt[5]{x^{10}}$$

$$\sqrt{x^4}$$

$$\sqrt[3]{x^8}$$

$$\sqrt[4]{x^{27}}$$

$$\sqrt{x^5}$$

$$\sqrt[3]{x^9}$$

$$\sqrt{x^6}$$

$$\sqrt{50}$$

$$\sqrt{32}$$

$$\sqrt[3]{32}$$

$$\sqrt[4]{32}$$

$$\sqrt{72x^2y^3z^8}$$

$$\sqrt[3]{72x^2y^3z^8}$$

$$\sqrt{200x^4y^8z^{15}}$$

$$\sqrt[3]{200x^4y^8z^{15}}$$

Product Rule:

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$$

Quotient Rule:

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

Is there a Sum Rule?

$$\text{Does } \sqrt{4+9} \stackrel{?}{=} \sqrt{4} + \sqrt{9}$$

$$\sqrt{2} \cdot \sqrt{8} =$$

$$\sqrt{6} \cdot \sqrt{8} =$$

$$\frac{\sqrt{x^2 y}}{\sqrt{x}} =$$

$$\sqrt{\frac{13}{25}} =$$

$$\sqrt{2x^3y} \cdot \sqrt{6xy^2} =$$

$$\frac{50\sqrt{20}}{2\sqrt{10}} =$$

Consider $\sqrt{(-5)^2} =$

If n is even, then $\sqrt[n]{a^n} =$ (to ensure answer is positive)

If n is odd, then $\sqrt[n]{a^n} =$

$$\sqrt{x^6} =$$

$$\sqrt[4]{(x+6)^4} =$$

$$\sqrt[3]{(-3)^3} =$$

$$\sqrt[5]{(7x-1)^5} =$$

$$\sqrt{36x^2} =$$

$$\sqrt{x^2+6x+9}$$

