

Radical Expressions and Rational Exponents

Roots: $\sqrt[3]{x} = x^{1/3}$, $\sqrt[4]{16} = 16^{1/4} = 2$
 cuz $2^4 = 16$ BUT $(-2)^4 = 16$

even power: 2 answers
 odd power: 1 answer

Ex. $\sqrt[3]{-8} = -2$
 $\sqrt[3]{125} = 5$

$\sqrt{-36} = \text{no solution}$ (squared can't be negative)

Radical Expressions \rightarrow Rational Exponents

$\sqrt[3]{x^4} = (x^4)^{1/3} = x^{4/3}$
 $\sqrt{7^5} = (7^5)^{1/2} = 7^{5/2}$
 $\sqrt[3]{8^2} = (8^2)^{1/3} = 8^{2/3} = 4$

Rational Exponents \rightarrow Radical Expressions

$16^{3/4} = \text{scribble} = \text{scribble}$
 $(16^3)^{1/4} = \sqrt[4]{16^3}$

$8^{2/3} = (8^2)^{1/3} = \sqrt[3]{8^2}$

Practice Problems

$\sqrt[3]{8x^3} = \sqrt[3]{8} \cdot \sqrt[3]{x^3}$
 $= 2 \cdot x = 2x$

$\sqrt[4]{256x^8} = \sqrt[4]{256} \cdot \sqrt[4]{x^8}$
 $= 4 \cdot x^2 = 4x^2$

$(-125)^{2/3} \rightarrow (\sqrt[3]{-125})^2 \rightarrow (-5)^2 = 25$

$\rightarrow \sqrt[3]{(-125)^2} \rightarrow \sqrt[3]{15,625} = 25$

$x^{2/3} \cdot x^{1/3} = x^{4/3} = x^2$

$\frac{4^{3/5}}{4^{1/5}} = 4^{2/5}$

$216^{-1/3} = \frac{1}{216^{1/3}} = \frac{1}{6}$

$\sqrt[3]{\frac{x^3}{7}}$
 $= \frac{\sqrt[3]{x^3}}{\sqrt[3]{7}}$

$= \frac{x}{\sqrt[3]{7}}$