



Déjà Vu, It's Algebra 2!

Lesson 24

Radical Expressions, Functions, & Equations

What is the square root of 25?

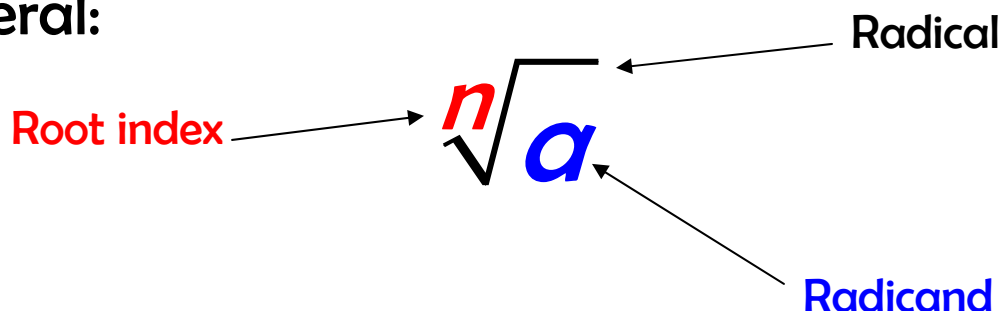
We can write this question using a **radical**: $\sqrt{25}$

When we ask this question, we really want to answer the following, *“What number, times itself, is equal to 25?”* The answer is 5, since $5 \cdot 5 = 5^2$

Is there another answer????????? What about -5 ?

Since $(-5)(-5) = (-5)^2 = 25$, $\sqrt{25} = \pm 5$

In general:



Example:

$$\sqrt[4]{81} = \quad \sqrt[3]{-125} = \quad \sqrt[6]{-729} = \quad -\sqrt{4^{-1}} =$$

Properties of Radicals:

$$1. \sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b}$$

$$2. \sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

Example:

Simplify the following expression: $\sqrt[4]{\frac{16x^8}{5}}$

A **rational exponent** is an exponent that can be expressed in the form $\frac{m}{n}$, where m and n are integers. Every radical expression can be written equivalently with rational exponents.

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

Example:

$$\left(\sqrt{x}\right)^3 =$$

$$\sqrt[4]{16x^3} =$$

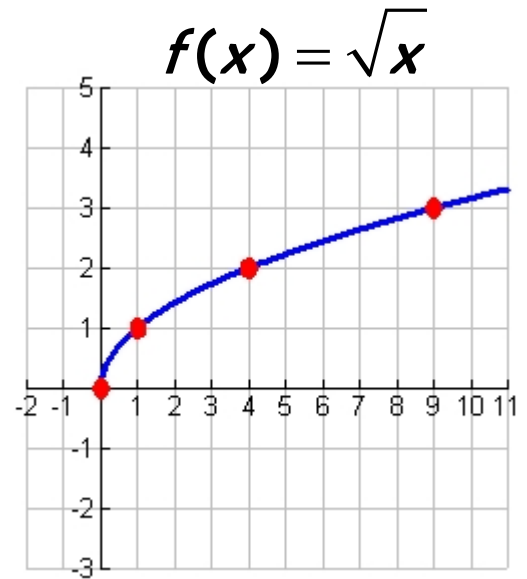
$$\left(-125\right)^{2/3} =$$

A **Radical Function** is a function containing a radical. A **square root function** contains \sqrt{x}

What does the graph of $f(x) = \sqrt{x}$ look like??

(notice the indicated root is positive)

x	$f(x) = \sqrt{x}$	$(x, f(x))$
0	$f(0) = \sqrt{0} = 0$	$(0, 0)$
1	$f(1) = \sqrt{1} = 1$	$(1, 1)$
4	$f(4) = \sqrt{4} = 2$	$(4, 2)$
9	$f(9) = \sqrt{9} = 3$	$(9, 3)$
16	$f(16) = \sqrt{16} = 4$	$(16, 4)$



We can graph transformations of this “parent” function of the form

$$g(x) = a\sqrt{b(x-c)} + d$$

Example:

Sketch $g(x) = 1 - 2\sqrt{3-x}$, then find the domain and range.

Déjà RE-Vu

Solve:

$$\sqrt{x+18} = x-2$$

