$\sqrt{}$ This symbol is called a radical it indicates finding a root.

The number in this spot is called the Index.

It tells what root you are to find.

If there is no index it means Square Root.

This quantity is called the Radicand

4^3	64
4^2	16
4^1	4
$4^{?}$	?
4^0	1

→

4^3	64
4^2	16
4^1	4
$4^{\frac{1}{2}}$	2
4^0	1

$4^{\frac{1}{2}} = 2$

What else using the number 4 equals 2?

$\sqrt{4} = 2$

Using substitution:

Since both $4^{\frac{1}{2}}$ and $\sqrt{4}$ equal 2 they must equal each other.

$$4^{\frac{1}{2}} = \sqrt{4}$$

If $4^{\frac{1}{2}} = \sqrt{4}$, then

what do these represent?

$4^{\frac{1}{3}} \rightarrow \sqrt[3]{4}$ the cube root of 4

$4^{\frac{1}{4}} \rightarrow \sqrt[4]{4}$ the fourth root of 4

$4^{\frac{1}{5}} \rightarrow \sqrt[5]{4}$ the fifth root of 4

What would this represent? $4^{\frac{1}{n}}$

$4^{\frac{1}{n}} = \sqrt[n]{4}$ the "nth" root of 4

If $\sqrt{x} = x^{\frac{1}{2}}$

How would you write $\sqrt{x^3}$ as a power of x?

$\sqrt{x^3} = (x^3)^{1/2} = x^{3/2}$

$a^{\frac{1}{n}} = \sqrt[n]{a}$ "the nth root of a"

Rational Exponents represent radicals (roots)

The denominator of the rational exponent represents the INDEX of the radical.

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