

The $\frac{1}{2}$ power is the same as the 2nd (square) root - $\sqrt{\quad}$.

The $\frac{1}{3}$ power is the same as the 3rd (cube) root - $\sqrt[3]{\quad}$.

Here are some examples (remember that negative exponents make things move across the fraction bar)

$$100^{1/2} = \mathbf{10}$$

$$100^{-1/2} = \frac{1}{100^{1/2}} = \frac{1}{10}$$

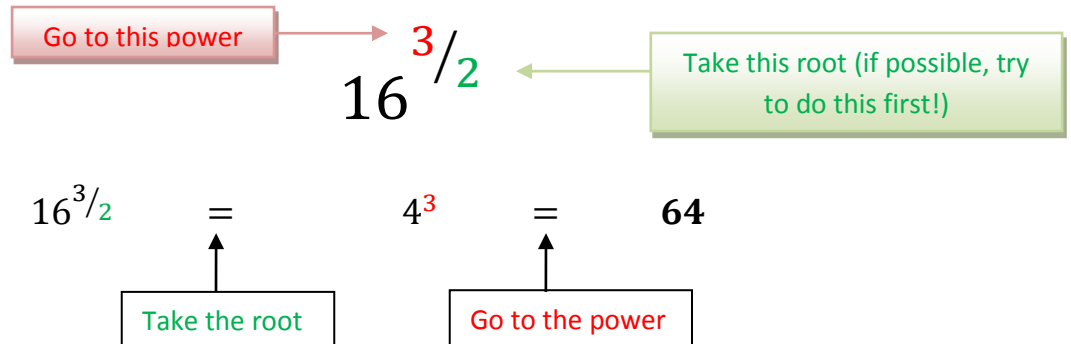
$$256^{1/2} = \mathbf{16}$$

$$256^{-1/2} = \frac{1}{256^{1/2}} = \frac{1}{16}$$

$$64^{1/3} = \mathbf{4}$$

$$64^{-1/3} = \frac{1}{64^{1/3}} = \frac{1}{4}$$

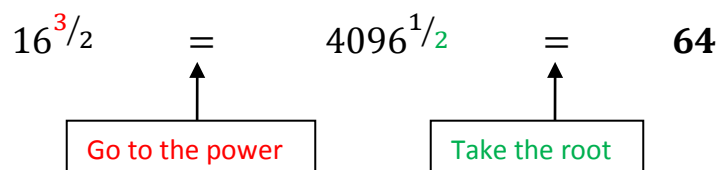
What do we do when the exponent is an improper fraction?



We are actually turning this into an expression that is a power to a power.

$$16^{3/2} = (16^{1/2})^3 = 4^3 = 64$$

You will get the same answer if you go to the power first and then take the root.



Here are some more examples of exponents that are improper fractions.

$$125^{2/3} = (125^{1/3})^2 = 5^2 = 25$$

$$100^{-3/2} = \frac{1}{100^{3/2}} = \frac{1}{(100^{1/2})^3} = \frac{1}{10^3} = \frac{1}{1000}$$

A decimal exponent can be changed into an improper fraction.

$$4^{2.5} = 4^{5/2} = (4^{1/2})^5 = 2^5 = 32$$

The same exponent rules apply when one (or all) of the exponents are fractions.

$$(36^2)^{1/4} = 36^{2/4} = 36^{1/2} = 6$$

Multiply the exponents
(power to a power)