28. Radicals!

Radicals are the opposite, the 'undoing' or inverse of applying exponents. It is equally as powerful as exponentiation. They are often commonly referred to as 'roots'

The following is read as "the square root of 4 is 2"

$\sqrt{4} = 2$

radical symbol

When finding a square root, we are finding what number can be raised to the second power and will become our original number. In the above example, 2 can be raised to the second power to get 4, so 2 is the square root of 4. $2^2 = 4$, so $\sqrt{4} = 2$

We can also write this as an exponent. A FRACTIONAL exponent. In this case, $4^{1/2} = 2$. This is equivalent to $\sqrt{4} = 2$.

$\sqrt{9} = 3$, because $3^2 = 3 * 3 = 9$

$\sqrt{25} = 5$, because $5^2 = 5 * 5 = 25$

$\sqrt{16} = 4$, because $4^2 = 4 * 4 = 16$

$\sqrt{36} = 6$, because $6^2 = 6 * 6 = 36$

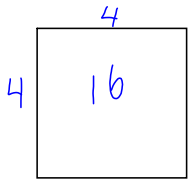
$\sqrt{81} = 9$, because $9^2 = 9 * 9 = 81$

$\sqrt{100} = 10$, because $10^2 = 10 * 10 = 100$

$\sqrt{144} = 12$, because $12^2 = 12 * 12 = 144$

$\sqrt{49} = 7$, because $7^2 = 7 * 7 = 49$

So why the word squared? Why is 4^2 called 4 squared? And why is 4 the square root of 16?



please remember that $4^4 = 4 * 4 * 4 * 4$

so, $4^2 * 4^2 = (4 * 4) * (4 * 4)$

so, $4^2 * 4^2 = 4^4$

so let's think about $4^{1/2}$

$4^{1/2} * 4^{1/2} = 4^1$, so what times itself equals 4^1?

Therefore, $4^{1/2}$ must equal 2

So what about something like $27^{1/3}$?

$27^{1/3} * 27^{1/3} * 27^{1/3} = 27^1$

We want to find something that when multiplied by itself and then by itself again, equals 27

$27^{1/3} =$ 3 x 3 x 3 = 27

$125^{1/3} =$ 5 _ _ = 125

$8^{1/3} =$ 2 _ _ = 8

$64^{1/3} =$ 4 _ _ = 64