EXPONENTS & ROOTS

Exponents are shorthand ways to write what would be a longer mathematical expression. For the repeated multiplicaton of the same number to itself. An *exponent* is a small superscript number that is placed next to another number at the top right. This number indicates how many times the base number is to be multiplied by itself.

Examples of exponents:

x^2

This means that x will be multiplied by itself twice:

$x \times x$

x^4

This means that x will be multiplied by itself four times:

$x \times x \times x \times x$

Example 1

$3^3 = 3 \times 3 \times 3 = 27$

$2^1 = 2$

$6^3 = 6 \times 6 \times 6 = 216$

$5^4 = 5 \times 5 \times 5 \times 5 = 625$

$3^2 = 3 \times 3 = 9$

$3^4 = 3 \times 3 \times 3 \times 3 = 81$

A number with an exponent of 2 is said to be “squared”, so x would be “x squared”. A number with an exponent of 3 is “cubed”, so, 5^3 is read as “5 cubed”. So, 6^4 is read as “6 to the 4th power” or “6 raised to the power of 4.”

A *root* is another way of writing a fractional exponent. It is the opposite operation of applying expontents. We are basically “undoing” a radical with a power (exponent). Instead of a superscript being used, roots use the *radical symbol (√)* to indicate the operation. A radical will have a number underneath the bar but may sometimes have a number in the upper left, such as $\sqrt[n]{a}$. This will be read as “the nth root of a.”

Example 2

$\sqrt{16} = \sqrt{4^2} = 4$

because $4 \times 4 = 16$,

so the square root of 16 is 4.

$\sqrt{36} = \sqrt{6^2} = 6$

because $6 \times 6 = 36$,

so the square root of 36 is 6.