Order of Operations

Powers and Square Root

BEDMAS:

We think of the term **BEDMAS** when considering the proper order of math calculations when presented with a single equation involving several operations.

B: Brackets first (must follow order of operations inside the set of brackets also)
E: Exponents (powers *and* square root)
D: Division
M: Multiplication (div./mult. are solved in a left to right order)
A: Addition
S: Subtraction (add./subt. are solved in a left to right order)

*Note, powers and square root calculations always get priority over div., mult., add., subt.
* Also, division/multiplication calculations always get priority over add./subt.

Powers:

A power is a way of representing *repeated multiplication.*

A power is made up of two parts: the base and the exponent

Ex.: 5^3 (base is 5, exponent is 3)

This power represents the calculation **5 x 5 x 5 = 125**

The base always indicates the number being multiplied by itself, and the exponent tells us the number of times.

*Exponent of 2 we say “squared”, exponent of 3 we say “cubed”

Word Problem:

A crate containing pencils is being shipped from Montreal to Toronto. The crate holds 10 large boxes, each box contains 10 bags, and each bag has 10 packages inside. Each of those packages has 10 pencils.

How many pencils are being shipped?

Calculation: 10 x 10 x 10 x 10 or **10^4 = 10 000**

***Any time that repeated multiplication is required, a power can be used to replace it.**

Square Root:

When determining the square root of a number, we are trying to determine what number (base in a power), when "squared" (exponent of 2), produces that result.

Ex.: $\sqrt{}$**81 = 9**

Because $9^2 = 81$ (or 9 x 9 = 81)

*When you know the area of square, you can calculate the square root of the area and you will get the measure of a side (side length).

Ex.: Area of a square = 144 m^2

$\sqrt{}$**144 = 12 (side length)**

Area= S^2

Area = 12^2

Area = 144m^2

Extended Square Root Symbol:

When a square root symbol is extended over a math equation, we calculate the square root of the final answer only.

*The order of operations must be followed at all times, but it is also important to understand that an **extended square root symbol acts as a bracket**, meaning that the calculations below it are done first.