

### 4.3 Order of Operations (REVIEW) - PEMDAS

"Operations" means things like add, subtract, multiply, divide, squaring, etc. If it isn't a number it is probably an operation.

But, when you see something like ... what do you do?

$$7 + (6 \times 5^2 + 3)$$

*Warning: Calculate them in the wrong order, and you will get a wrong answer!*

Order of Operations

**Do things in Parentheses First.** Example:

$$6 \times (5 + 3) = 6 \times 8 = 48$$

$$6 \times (5 + 3) = 30 + 3 = 33 \text{ (wrong)}$$

**Exponents (Powers, Roots) before Multiply, Divide, Add or Subtract.** Example:

$$5 \times 2^2 = 5 \times 4 = 20$$

$$5 \times 2^2 = 10^2 = 100 \text{ (wrong)}$$

**Multiply or Divide before you Add or Subtract.**

Example:

$$2 + 5 \times 3 = 2 + 15 = 17$$

$$2 + 5 \times 3 = 7 \times 3 = 21 \text{ (wrong)}$$

**Otherwise just go left to right.** Example:

$$30 \div 5 \times 3 = 6 \times 3 = 18$$

$$30 \div 5 \times 3 = 30 \div 15 = 2 \text{ (wrong)}$$

# How Do I Remember It All ... ? PEMDAS !

- ① **P** Parentheses first
- ② **E** Exponents (ie Powers and Square Roots, etc.)
- ③ **MD** Multiplication and Division (left-to-right)
- ④ **AS** Addition and Subtraction (left-to-right)

\*\*Divide and Multiply equally (and go left to right)

\*\*Add and Subtract equally (and go left to right)

## Examples

Example: How do you work out  $3 + 6 \times 2$  ?

$$3 + 12$$

$$\textcircled{15}$$

Example: How do you work out  $(3 + 6) \times 2$

$$(9) \times 2$$

$$\textcircled{18}$$

$$7 + (6 \times 5^2 + 3)$$

$$7 + (6 \times 25 + 3)$$

$$7 + (150 + 3)$$

$$7 + (153)$$

$$\boxed{160}$$

$$9 - 12 \div 4 + 2$$

$$9 - 3 + 2$$

$$6 + 2 = \textcircled{8}$$

~~$$9 - 3 + 2$$

$$9 - 5$$

$$4$$~~

$$45 + 10(32 - 32) + 40$$

$$45 + 10 \cdot (0) + 40$$

$$45 + 0 + 40$$

$$45 + 40 = \boxed{85}$$

$$\star 16 + 5 \cdot 7 - 81 \div 9 + 30$$

$$16 + 35 - 81 \div 9 + 30$$

$$16 + 35 - 9 + 30$$

$$16 + 35 - 9 + 30$$

$$51 - 9 + 30$$

$$42 + 30$$

$$\boxed{72}$$