

Our goal today is to review PEMDAS and see how we apply that to solving equations in ALGEBRA -

it is NOT please excuse my dear aunt sally - that is baby elementary talk!!!
What do those letters stand for???
Think about your answer to this question!



Hint: when working order of operations problems, please write down the original problem first. Always. Then begin to solve the problem following the order of operations. Make sure you show your work so we can all see if you understand the process completely!

Order of operations - 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 ...

$$7 + (6 \times 52 + 3)$$

... what part should you calculate first?

Start at the left and go to the right?

Or go from right to left?

Everyone - find an answer for the problem above and let's discuss if we all got the same thing. If you know the order of operations - do not use it - just do the problem as if you did not know the order of operations.

Okay - what did everyone get?

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

So, long ago people agreed to always follow certain rules when doing calculations, and they are:
Order of Operations

Do things in Parentheses First. Example:

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

$$6 \times 8 = 48$$

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

$$30 + 3 = 33$$

Exponents (Powers) before Multiply, Divide, Add or Subtract.

Example:

$$5 \times 2^3 = 5 \times 8 = 40$$

Multiply or Divide from left to right before you Add or Subtract from left to right.

Example:

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

Otherwise just go left to right.

Example:

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

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

Example:

$$5 \times 2^3 =$$

$$5 \times 8 = 40$$

Multiply or Divide from left to right before you Add or Subtract.

Example:

$$2 + 5 \times 3 =$$

$$2 + 15 = 17$$

Otherwise just go left to right.

Example:

$$30 \div 5 \times 3$$

$$= 6 \times 3$$

$$= 18$$

Multiplication before Addition:

First $6 \times 2 = 12$, then $3 + 12 = 15$

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

Parentheses first:

First $(3 + 6) = 9$, then $9 \times 2 = 18$

Example: How do you work out

Multiplication and Division rank equally, so just go left to right:

First $12 / 6 = 2$, then $2 \times 3 = 6$

Oh, yes, and what about $7 + (6 \times 52 + 3)$?

$7 + (6 \times 52 + 3)$

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Start inside Parentheses, and then use Exponents First

$7 + (312 + 3)$

Then Multiply

$7 + (315)$ Then Add

$7 + 315$ Parenthesis completed, last operation is an Add

322 DONE !

Copy these problems into your notebook and solve please:

1. $2(6 - 3 + 2)$

2. $3 + 6(13 - 7)$

3. $4(7) - 4 + 3(6)$

4. $8(9) - 3 + 6(7) - 2$

How Do I Remember ? PEMDAS !

P Parentheses first

E Exponents (ie Powers and Square Roots, etc.)

MD Multiplication and Division (left-to-right)

AS Addition and Subtraction (left-to-right)

Note: Multiply and Divide rank equally. Add and Subtract rank equally.

After you have done "P" and "E", just go from left to right doing any "M" or "D" as you find them.

$$3 \cdot \left[\frac{7(4^2 - 2 + 6)}{2} \right] =$$

OR

$$3 \left[\frac{7(4^2 - 2 + 6)}{2} \right] =$$

Parenthesis first - okay - $4^2 - 2 + 6$ equals $16 - 2 + 6$.

Work left to right and I get 20.

Next 20 times 7 equals 140. Okay now...

hmmm

140 needs to be divided by 2 before I can multiply by 3

because that whole problem is inside brackets and I

work inside out with more than one set of () or [].

so 140 divided by 2 = 70 and 70 times 3 = 210.

Is the answer 210? hmmm - what do you think?



Oh my goodness! The order of operations can get pretty complicated - whew! That last problem with the stuff in the numerator and a 2 in the denominator - it was important to solve everything in the numerator by doing parenthesis first then multiply the answer to what is in the parenthesis by 7, then divide that product by 2 THEN....multiply that quotient by 3. What an awesome problem!