Order of Operations
(BEDMAS)

When evaluating a mathematical expression, the operations must be done in a certain order. This order is sometimes called BEDMAS, after the first letters of the operations:

Brackets:	Evaluate what's inside the parentheses first. If there are brackets within brackets, do the ones that are farthest inside first. This step includes anything under a square root sign, the numerator or denominator of a fraction, or an expression in an exponent.
Exponents:	Calculate the results of any exponential expressions. Since square roots can also be exponents, they should also be evaluated in this step.
Division & **M**ultiplication:	Evaluate these from left to right. Multiplication and division have equal priority in order of operations.
Addition & **S**ubtraction:	Evaluate these last, from left to right. Addition and subtraction also have equal priority.

Let's try some examples:

1) $3 + 3 \times 4$
    $= 3 + \mathbf{12}$ (We multiply before we add.)
    $= \mathbf{15}$ (We add last.)

2) $(3 + 3) \times 4$
    $= \quad \mathbf{6} \quad \times 4$ (We do the brackets first. We add, and now because we have one positive number in brackets, we remove them.)
    $= \mathbf{24}$ (We multiply, because it's the only step left.)

3) $2[2 + 2(3 - 6 \div 3 \times 4 - 9) + 6^2]$
    $= 2[2 + 2(3 - \quad \mathbf{8} \quad - 9) + 6^2]$ (We start in the inside brackets. We multiply and divide, from left to right, first.)
    $= 2[2 + 2(\quad \mathbf{-14} \quad) + 6^2]$ (We subtract. Because the brackets contain a negative number, we must keep them.)
    $= 2[2 + 2(-14) \qquad + \mathbf{36}]$ (We evaluate exponents before anything else.)
    $= 2[2 \quad \mathbf{-28} + 36]$ (The number in front of the brackets means multiplication. We do the square brackets next, and we multiply before we add or subtract.)
    $= 2 \times \mathbf{10}$ (We add and subtract from left to right. We can replace the brackets with a "×" sign.)

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= **20** (We multiply, because it's the only step left.)

EXERCISES

A. Evaluate:

1) $(3 + 9 \times 2 - 4) \times 2 + 7 \times 6 =$

2) $(6 + 5) \times 4 - [1 + 2 \times 8] + 12 \times 2 =$

3) $-3 \times (6 + 3 \times 7 - 5^2) \times 2 + 6^2 \div 9 \times 2 =$

4) $(3^3 + 8 \div 4 - 5) \times 2 + 5 \times 9 - \sqrt{16}$

5) $(9 \times 8 - 4 \times 3) \div 5 - 7 + 4(5 \times 3^2) =$

6) $19 - [(4 + 4 \times 4 + 4) \div 3 + 7] \div 3 =$

7) $(4 + 4) \times (4 + 4) + 2 - 18 \div (5 - 2^3) =$

8) $3.5[7 \times 3 + (-1)^3] + \dfrac{7 - 4 \times 3}{2^2 + 9 \div 3^2} =$

9) $\sqrt{(17^2 - 3^2) \times \dfrac{13 - 2^3}{2^4 - 2}} - [(2^3 \times 3^2) \div (5^{(7-5)} - 1)]^2 =$

SOLUTIONS:

A. (1) 76   (2) 51   (3) −4   (4) 89   (5) 185   (6) 14   (7) 72   (8) 69   (9) 1