SIMPLIFICATION

1. BODMAS Rule

It is a rule which tells us the correct order in which the operations are to be executed.

TO FIND THE EXPRESSION VALUE	
B	Bracket
O	of
D	Division
M	Multiplication
A	Addition
S	Subtraction

STEPS TO EVALUATE THE EXPRESSION

1. Remove braces in the order	i. (). ii. {}. iii. ||.
2. Then you must do the operations in order	i. of. ii. Division. iii. Multiplication. iv. Addition v. Subtraction.
3. Modulus of a Real Number	|a| = a, if a > 0 = -a, if a < 0 Example: |5| = 5 and |-5| = - (-5) = 5.
3. Virnaculum / Bar	When an expression contains Virnaculum, before applying the 'BODMAS' rule, we simplify the expression under the Virnaculum.

Problems with solutions

1. $a - b = 3$ and $a^2 + b^2 = 29$, find the value of ab.

Solution

$2ab = (a^2 + b^2) - (a - b)^2$

$= 29 - 9 = 20$

$ab = 10$

2. A fires 5 shots to B's 3 but A kills only once in 3 shots while B kills once in 2 shots. When B has missed 27 times, A has killed:

Solution

Let the total number of shots be x. Then,

Shots fired by A = $\frac{5}{8}x$

Shots fired by B = $\frac{3}{8}x$

Killing shots by A = $\frac{1}{3}$ of $\frac{5}{8}x = \frac{5}{24}x$

Shots missed by B = $\frac{1}{2}$ of $\frac{3}{8}x = \frac{3}{16}x$

$\frac{3x}{16} = 27$ or $x = \left(\frac{27 \times 16}{3}\right) = 144.$

Birds killed by A = $\frac{5x}{24} = \left(\frac{5}{24} \times 144\right) = 30.$

3. To fill a tank, 25 buckets of water is required. How many buckets of water will be required to fill the same tank if the capacity of the bucket is reduced to two-fifth of its present ?

Solution

Let the capacity of 1 bucket = x.

Then, the capacity of tank = 25x.

New capacity of bucket = $\frac{2}{5}x$

$\therefore$ Required number of buckets = $\frac{25x}{(2x/5)}$

$= \left(25x \times \frac{5}{2x}\right)$

$= \frac{125}{2}$

$= 62.5$

4. In a regular week, there are 5 working days and for each day, the working hours are 8. A man gets Rs. 2.40 per hour for regular work and Rs. 3.20 per hours for overtime. If he earns Rs. 432 in 4 weeks, then how many hours does he work for ?

Solution

Suppose the man works overtime for x hours.

Now, working hours in 4 weeks = (5 x 8 x 4) = 160.

160 x 2.40 + x x 3.20 = 432

3.20x = 432 - 384 = 48

x = 15.

Hence, total hours of work = (160 + 15) = 175.

5. A man has some hens and cows. If the number of heads be 48 and the number of feet equals 140, then the number of hens will be:

Solution

Let the number of hens be x and the number of cows be y.

Then, $x + y = 48$ .... (i)

and $2x + 4y = 140 \Rightarrow x + 2y = 70$ .... (ii)

Solving (i) and (ii) we get: $x = 26$, $y = 22$.

The required answer = 26.