Significant Figures in Calculation.

In most of the experiments, the observations of various measurements are to be combined mathematically, i.e., added, subtracted, multiplied or divided as to achieve the final result. Since, all the observations in measurements do not have the same precision, it is natural that the final result cannot be more precise than the least precise measurement. The following two rules should be followed to obtain the proper number of significant figures in any calculation.

(1) The result of an addition or subtraction in the number having different precisions should be reported to the same number of decimal places as are present in the number having the least number of decimal places. The rule is illustrated by the following examples:

(i) 33.3 ← (has only one decimal place)
3.11
+ 0.313
36.723 ← (answer should be reported to one decimal place)

Answer = 36.7

(ii) 3.1421
0.241
+ 0.09 ← (has 2 decimal places)
3.4731 ← (answer should be reported to 2 decimal places)

Answer = 3.47

(iii) 62.831 ← (has 3 decimal places)
– 24.5492
38.2818 ← (answer should be reported to 3 decimal places after rounding off)

Answer = 38.282

(2) The answer to a multiplication or division is rounded off to the same number of significant figures as is possessed by the least precise term used in the calculation. The rule is illustrated by the following examples :

(i) 142.06

$\times$ 0.23 ← (two significant figures)

32.6738 ← (answer should have two significant figures)

Answer = 33

(ii) 51.028

$\times$ 1.31 ← (three significant figures)

66.84668

Answer = 66.8

(iii) $\frac{0.90}{4.26} = 0.2112676$

Answer = 0.21