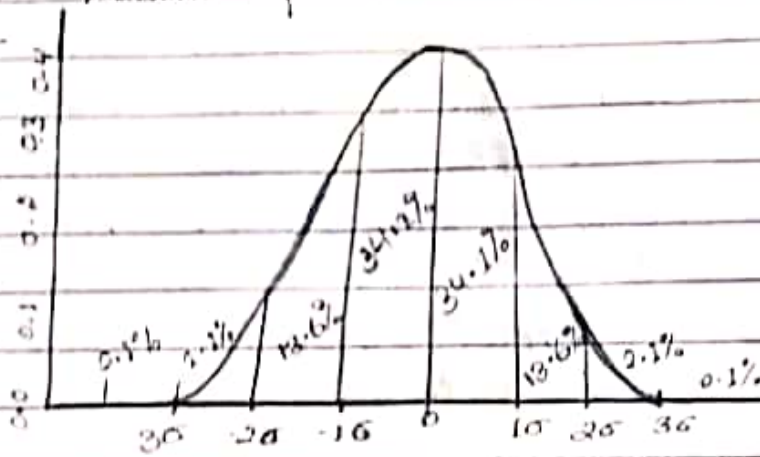


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for B.Sc part 1st, paper 2 (A).

Ques :- Write notes on STANDARD ERROR
of MEAN ?

Ans :-



For a value that is sampled with an unbiased normally distributed error, the above depicts the proportion of samples that would fall between 0, 1, 2, and 3 standard deviations above and below the actual value.

The standard error (SE) of a statistic (usually an estimate of a parameter) is the standard deviation of its sampling distribution or an estimate of that standard deviation. If the parameter or the statistic is the mean, it is called the

standard error of the mean (SEM).

The sampling distribution of a population mean is generated by repeated sampling and recording of the means obtained. This forms a distribution of different means, and this distribution has its own mean and variance.

Mathematically, the variance of the sampling distribution obtained is equal to the variance of the population divided by the sample size. This is because as the sample size increases, sample means cluster more closely around the population mean.

Standard error of the mean :-

Population :-

The standard error of the mean (SEM) can be expressed as :

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Where

σ is the standard deviation of the population.

n is the size (number of observations) of the sample.

Derivations :-

The formula may be derived from the variance of a sum of independent random variables.

- If x_1, x_2, \dots, x_n are n independent observations from a population that has a mean μ and standard deviation σ , then the variance of the total.

$$T = (x_1 + x_2 + \dots + x_n) \text{ is } n\sigma^2.$$

- The variance of T/n (the mean \bar{x}) must be

$$n \left(\frac{\sigma^2}{n^2} \right) = \frac{\sigma^2}{n}. \text{ Alternatively,}$$

$$\text{Var} \left(\frac{T}{n} \right) = \frac{1}{n^2} \text{Var} (T) = \frac{1}{n^2} n\sigma^2 = \frac{\sigma^2}{n}.$$

- And the standard deviation of T/n must be σ/\sqrt{n} .

v.t.t.d. with random sample size