

8. STATISTICS AND PROBABILITY

Learning Outcomes

- ✚ To recall the measures of central tendency.
- ✚ To recall mean for ungrouped and grouped data.
- ✚ To understand the concept of dispersion.
- ✚ To understand and compute range, standard deviation, variance and coefficient of variation.
- ✚ To understand random experiments, sample space and use of a tree diagram.
- ✚ To define and describe different types of events of a random experiment.
- ✚ To understand addition theorem of probability and apply it in solving some simple problems.

Important Key Points and Results

- Data: The numerical representation of facts is called data.
- Observation: Each entry in the data is called an observation.
- Variable: The quantities which are being considered in a survey are called variables. Variables are generally denoted by x_i , $i=1, 2, 3 \dots n$.
- Frequencies: The number of times, a variable occurs in a given data is called the frequency of that variable. Frequencies are generally denoted as f_i , $i=1, 2, 3 \dots n$.
- If the frequency of initial class is zero, then the next class will be considered for the calculation of range.

- The range of a set of data does not give the clear idea about the dispersion of the data from measures of Central Tendency. For this, we need a measure which depend upon the deviation from the measures of Central Tendency
- We note that $(x_i - \bar{x})^2 \geq 0$ for all observations $x_i, i = 1, 2, 3, \dots, n$. If the deviations from the mean $(x_i - \bar{x})$ are small, then the squares of the deviations will be very small.
- Karl Pearson was the first person to use the word standard deviation. German mathematician Gauss used the word Mean error.
- The standard deviation and mean have same units in which the data are given
- In 1713, Bernoulli was the first to recognize the wide-range applicability of probability in fields outside gambling
- **Elementary event:** If an event E consists of only one outcome then it is called an **elementary event**.