CHAPTER ONE

Objectives

At the end of this chapter, students will be able to:

i) Know the several schools of thoughts and their contribution to probability.

ii) Understand the approaches to probability**.**

INTRODUCTION TO PROBABILITY

Life would have not been safe and enjoyable supposing we lacked the ability to predict it. Prediction involves studying certain events under normal circumstances and making a statement that explains how the event will be in the nearest future. Several tools, especially mathematical tool have made it possible for the prediction of certain events in other to plan wisely against the future. One of these important tools is "Probability'.

The word "probability" also referred to as "chance" is mostly used in our day to day activity either knowingly or unknowingly, for example, we may come across statements like " There is a probability that the sun might shine today" or "there is a probability that it might rain for the next two days".

Probability can be seen as an expression of likelihood or chance or an occurrence of an event given the total events that occur under a given experimentation. Probability is the relative frequency of an event which ranges from zero to one (0-1), i.e. zero for an event that do not occur, while one for an event certain to occur. There is no general agreement about its interpretation because many people mistake probability with nebulous and mystics ideas. It should be noted that the task of assigning the numbers should depend on the interpretation.

So far, four schools of thought have contributed to the concept of probability.

Their approaches to probability are:

1) Classical or prior approach to probability
2) Relative frequency theory to probability
3) Axiomatic approach to probability
4) Subjective approach to probability

In conclusion, the four explained approaches to probability above are important in solving problems related to probability. They explain the real life situation that involve probability. Experts still argue on the most appropriate theory to be adopted.

CHAPTER 2

MATHEMATICAL PROBABILTY

Objectives

At the end of this topic, students should be able to:

i) Understand the mathmatical application of probability

ii) Solve problems related to mathmatical probability

iii) Understand the occurrence of events and their level of dependency

iv) Perform operations that involve selection and arrangement.

The word "mathematical" is an adjective that qualifies or describes the noun "probability". The word "mathematical probability" describe the probability that is related to mathematics. It seeks to use mathematics as a tool to solve most problems that have been the drawbacks of probability. It focuses on the practical application of probability, based on random events. Random event may only occur when the experiment is repeated as many times as possible without we having control over the possible outcomes. Mathematical probability unvails concepts like:

i) Mutually exclusive events
ii) Conditional events
iii) Exhausive event
iv) Complementary event
v) Equally likely events
vi) Dependent and independent events

EXHAUSTIVE EVENTS

Different set of events $E_1, E_2, E_3, E_4 ...... E_n$ are said to be exhaustive events if their totality include all the possible outcomes of a random experiment(sample space). Those events are said to form an exhaustive set of probabilities if one of them must necessarily occur when a random experiment is conducted. For events to be exhausive, the sumation of their probabilities must be equal to a unity (1).

$$P(E_1 + E_2 + E_3 + E_4 + ... + E_n) = 1$$

If the two dices are thrown, the total number of outcomes is denoted by

$6^2 = 36$ since two dices are involved in the experiment.

Example 1: supposing the probability of hitting a target with an arrow is $\frac{2}{7}$, *then the* probability of missing the target is;

$$P(A) + P(B) = 1$$

Where $P(A) = probability\ of\ hit = \frac{2}{7}$,

$$P(B) = \text{probability of miss}$$

$$P(B) = 1 - P(A)$$

$$P(B) = 1 - \frac{2}{7} = \frac{5}{7}.$$

The above solution interpretes that P(B) is the probability of the event A not occuring and it is expressed as $A^!$.

Example 3: given that the probability of (A or C) is $\frac{3}{6}$ and that of (B or C) is $\frac{2}{6}$, then calculate the probability of C.

A or C is given as $P(A \cup C) = P(A) + P(C) = \frac{5}{6}$

B or C is given as $P(B \cup C) = P(B) + P(C) = \frac{2}{6}$

$$P(A) + P(B) + P(C) = 1$$

$$P(A) = 1 - (P(B \cup C))$$

$$= 1 - \frac{2}{6} = \frac{4}{6}$$