Probability

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Chapter 1

Module 8: Introduction

1.1 Introduction To Probability

Definition 1.1.1: Probability

A mathematical description of randomness and uncertainty / The likelihood of an event occurring.
The notation for Probability is $P(X)$ where X is the event.
Probability is always between $0 \leqslant P(X) \leqslant 1$ or $0\% \leqslant P(X) \leqslant 100\%$.

There are two ways of determining probability:

- Theoretical / Classical - Determined by the nature of the experiment
- Empirical / Observational - Determined by the results of the experiment

1.2 Relative Frequency

Definition 1.2.1: Relative Frequency

Relative frequency is the number of times an event occurs divided by the total number of trials.

$$P(X) = \frac{\text{Number of times event occurs}}{\text{Total number of trials}}$$

Theorem 1.2.1 The Law of Large Numbers

As the number of trials increases, the relative frequency of an event approaches the theoretical probability of the event.

Chapter 2

Module 9: Find the Probability of Events

2.1 Sample Spaces and Events

Definition 2.1.1: Random Experiment

An experiment whose outcome is determined by chance.

Definition 2.1.2: Sample Space

The list of possible outcomes of a random experiment, denoted by S.

Definition 2.1.3: Event

A statement about the nature of the outcome after the experiment has been conducted, denoted by any capital letter except S.

2.2 Equally Likely Outcomes

$$P(A) = \frac{\text{Number of outcomes in } A}{\text{Number of outcomes in } S}$$

Where A is an event and S is the sample space.