UNIT 4

SETS AND PROBABILITY, (SYLLABUS REF: 1.1, 3.5 – 3.7)

Aim:

To introduce the number sets and the basic concepts of set theory. And, also, to determine the likelihood of random events using a variety of techniques (probability).

Objective:

SETS *(CHAPTER 7A-C)*

☐ Understand the concept of sets as a collection of numbers or objects.
☐ Understand and use the notation $\in$ and $\notin$.
☐ Use the correct brackets for listing elements.
☐ Know how to describe an empty set, and use the correct notation for it, $\{\}$ or $\emptyset$.
☐ Understand the concept of *subsets*, and use the notation $\subseteq$.
☐ Understand the concept of *intersection*, and use the notation $\cap$.
☐ Understand the concept of *union*, and use the notation $\cup$.
☐ Know what is meant by a *disjoint* set.
☐ Interpret and write sets using "*set builder notation*".
☐ Know what is meant by a *universal set*.
☐ Know what the *complement* of a set is, and the notation for it, $'$.
☐ Understand and use the notation for the number of elements in a set, n(A).
☐ Be familiar with the special number sets: Natural numbers, Integers, Rational numbers and Real numbers, and understand the relation between them as subsets.
☐ The notation for the number sets listed above.
☐ Understand when a set is infinite and finite, and be able to list elements in sets that are finite.

VENN DIAGRAMS *(CHAPTER 7D-G)*

☐ Know how to draw a Venn diagram, including the rectangle to represent the universal set and the circle(s) to represent the sets.
☐ Know how to draw and how to interpret a Venn diagram including subsets:

☐ Know how to draw and interpret a Venn diagram including intersection(s).
☐ Know how to draw and interpret a Venn diagram including unions(s).
☐ Know how to draw and interpret a Venn diagrams that are disjoint.
☐ Find number in regions of regions and understand to be aware that it is easy to count the intersection region twice.
☐ Shade the asked region in a Venn diagram.
☐ Solve problems including Venn diagrams, with up to three sets.

PROBABILITY *(CHAPTER 9, 9B 1, 9C.2-F)*

☐ Understand the difference between experimental probability and theoretical probability.
☐ Understand the notation for probability as *P(A).*
☐ Understand that for any event $0 \leq P(A) \leq 1$.
☐ Know and use the basic concept that the probability for an event A is given by $P(A) = \frac{n(A)}{n(U)}$.
☐ Know what is meant by the *sample space*.
☐ Know what is meant by *complementary events*.
☐ Understand and use $P(A) + (P(A') = 1 \rightarrow P(A') = 1 - P(A)$

☐ Use grids to solve problems in probability.
☐ Use tree diagrams to solve problems in probability.
☐ Use Venn diagrams to solve problems in probability.

☐ Understand the concepts of *independent events, mutually events* and *conditional probability*.
☐ Understand and use the formula for combined events $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.
☐ Be aware of that never assume events are independent unless one is absolutely sure that they are.

☐ Use the formula $P(A \cap B) = P(A)P(B)$ for independent events.
☐ Use the formula $P(A \cup B) = P(A) + P(B)$ for mutually exclusive events.
☐ Solve problems including all concepts of probability.

EXPECTED VALUE *(CHAPTER 9, 9G)*

☐ Understand the basic concept of how often we can expect an event to happen when repeating the trials several times as *np* (*n* trials, probability for the event is *p*.
☐ Know how to solve problems including expected values, such as finding fair games.
☐ Remember that expected values is an average value from repeated trials over a long period.

TOK-links:

Consider the probabilities to win lotteries, and discussions about the "next time".

Does the knowledge of probability affect the life we live, and decisions we make?

ATL

Introduction by simple investigations with coins, dice and pack of cards.

Investigation to find the rule for independent events.

Discuss presumed knowledge. Think, pair, share.

Discuss projects within the topic ideas.

Introduction videos.

Learning checks and quizzes with individual feedback.

Assessment

Formative: Quizzes and individual work on examination questions.

Summative, included in test exam April 27.