

## **Deira International School**

IB DP HL Applications and Interpretations HL (IB1)



# **Summary**

# **HL Probability**

Subject Start date Duration Year Week 4, January Mathematics: applications IB1 8 weeks

and interpretation

Course Part

Description

In this unit you will learn how to use sophisticated probability techniques to solve real life problems.



# Inquiry & Purpose

(?) Inquiry / Higher Order Questions

Туре	Inquiry Questions
Skills-based	What are the limitations of discrete distributions?
Skills-based	How is the normal distribution model flawed when considering negative values in real life scenarios?

## Curriculum



Develop logical and creative thinking, and patience and persistence in problem solving to instil confidence in using mathematics

Objectives

Knowledge and understanding: Recall, select and use their knowledge of mathematical facts, concepts and techniques in a variety of familiar and unfamiliar contexts.

Technology: Use technology accurately, appropriately and efficiently both to explore new ideas and to solve problems.

Syllabus Content

Topic 4: Statistics and probability

SL Content



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#### SL 4.5

Concepts of trial, outcome, equally likely outcomes, relative frequency, sample space (U) and event.

The probability of an event 
$$A$$
 is  $\mathrm{P}(A) = \dfrac{n(A)}{n(U)}$ 

The complementary events A and A' (not A).

Expected number of occurrences.

#### SL 4.6

Use of Venn diagrams, tree diagrams, sample space diagrams and tables of outcomes to calculate probabilities.

Combined events: 
$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Mutually exclusive events:  $P(A \cap B) = 0$ .

Conditional probability: 
$$\mathrm{P}(A|B) = \frac{\mathrm{P}(A\cap B)}{\mathrm{P}(B)}$$

Independent events:  $P(A \cap B) = P(A)P(B)$ .

#### SL 4.7

Concept of discrete random variables and their probability distributions.

Expected value (mean),  $\mathrm{E}(X)$  for discrete data.

Applications.

### SL 4.8

Binomial distribution.

Mean and variance of the binomial distribution.

## SL 4.9

The normal distribution and curve.

Properties of the normal distribution.

Diagrammatic representation.

Normal probability calculations.

Inverse normal calculations

#### **AHL Content**

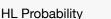
### AHL 4.15

A linear combination of n independent normal random variables is normally distributed. In particular,

$$X \sim \mathrm{N}\left(\mu, \quad \sigma^2
ight) \Rightarrow \overline{X} \sim \mathrm{N}\left(\mu, rac{\sigma^2}{n}
ight)$$

Central limit theorem.

AHL 4.17





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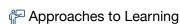
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Poisson distribution, its mean and variance.

Sum of two independent Poisson distributions has a Poisson distribution.



# **ATL** Skills





Thinking



# Developing IB Learners



☆ Learner Profile



Inquirers



Knowledgeable



**Thinkers**