

IB DP IB Mathematics Analysis and approaches SL 2022
(IB1)

Summary

SL Chapter 5 - Differentiation

Subject

Mathematics: analysis and approaches

Year

IB1

Start date

Week 2, January

Duration

5 weeks

Course Part

Description

In this unit you will explore the graphical interpretation of first and second derivatives and the application of differential calculus in optimisation and kinematics.

Inquiry & Purpose

? Inquiry / Higher Order Questions

Type

Inquiry Questions

Concept-based

What is differentiating from first principles and how was it formulated?

Skills-based

How do we use differentiation to optimise a real-life scenario?

Curriculum

⊕ Aims

Communicate mathematics clearly, concisely and confidently in a variety of contexts

◇ Objectives

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

📖 Syllabus Content

Topic 5: Calculus

SL Content

SL 5.1

Introduction to the concept of a limit.

Derivative interpreted as gradient function and as rate of change.

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SL 5.2

Increasing and decreasing functions.

Graphical interpretation of $f'(x) > 0$, $f'(x) = 0$, $f'(x) < 0$

SL 5.3

Derivative of $f(x) = ax^n$ is $f'(x) = anx^{n-1}$, $n \in \mathbb{Z}$

The derivative of functions of the form $f(x) = ax^n + bx^{n-1} \dots$ where all exponents are integers.

SL 5.4

Tangents and normals at a given point, and their equations.

SL 5.6

The chain rule for composite functions.

The product and quotient rules.

SL 5.7

The second derivative.

Graphical behaviour of functions, including the relationship between the graphs of f , f' and f''

SL 5.8

Local maximum and minimum points.

Testing for maximum and minimum.

Optimization.

Points of inflexion with zero and non-zero gradients.

SL 5.9

Kinematic problems involving displacement s , velocity v , acceleration a and total distance travelled.



ATL Skills



Approaches to Learning



Thinking

- In this unit, we will

reward a new personal understanding, solution or approach to an issue

set students a task which required higher-order thinking skills (such as analysis or evaluation)

ask questions that required the use of knowledge from a different subject from the one you are teaching

include a reflection activity

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Developing IB Learners

☆ Learner Profile



Inquirers



Knowledgeable



Thinkers



Open-minded