Duration

7 weeks

Mary Assaad, Thomas Jacobs

IB DP Mathematics Analysis HL (IB2)



Summary

HL Calculus (differential equations, Maclaurin series, L'hopital's rule)

Subject Mathematics: analysis and IB2 Week 3. October

Year

approaches

Course Part

Description

In this chapter we aim to solve differential equations. Differential equations are equations involving a derivative of a function.

Start date

Inquiry & Purpose

(?) Inquiry / Higher Order Questions

Type **Inquiry Questions**

Skills-based Use differential equations to solve Newton's law of cooling, population growth, and carbon dating

Skills-based Develop Maclaurin series from differential equations

Curriculum



Employ and refine their powers of abstraction and generalization

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

AHL Content

AHL 5.13

The evaluation of limits of the form $\lim_{x \to a} \frac{f(x)}{g(x)}$ and $\lim_{x \to \infty} \frac{f(x)}{g(x)}$ using l'Hôpital's rule or the Maclaurin series.

Repeated use of l'Hôpital's rule.

AHL 5.18

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First order differential equations.

Numerical solution of $\frac{\mathrm{d}y}{\mathrm{d}x}=f(x,y)$ using Euler's method.

Variables separable.

Homogeneous differential equation $\frac{\mathrm{d}y}{\mathrm{d}x}=f\left(\frac{y}{x}\right)$ using the substitution y=vx.

Solution of y' + P(x)y = Q(x), using the integrating factor.

AHL 5.19

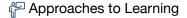
Maclaurin series to obtain expansions for $egin{align*} \mathrm{e}^x, & \sin x, & \cos x, & \ln(1+x), & (1+x)^p \ p \in \mathbb{Q} \ \end{cases}$

Use of simple substitution, products, integration and differentiation to obtain other series.

Maclaurin series developed from differential equations.



ATL Skills





Thinking

- In this unit, we will

ask students to formulate a reasoned argument to support their opinion or conclusion give students time to think through their answers before asking them for a response reward a new personal understanding, solution or approach to an issue ask open questions

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

help students to make their thinking more visible (for example, by using a strategy such as a thinking routine) require students to take an unfamiliar viewpoint into account when formulating arguments ask questions that required the use of knowledge from a different subject from the one you are teaching include a reflection activity

make a link to TOK

build on a specific prior task

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