

IB DP IB1 HL Applications (Mr Jacobs) (IB2)



Summary

HL - Complex numbers

Subject Start date Duration Year Mathematics: applications IB2 Week 4, October 4 weeks

and interpretation

Course Part

Description

In this unit you will further extend your knowledge of the number system by learning what complex numbers are and how to manipulate them.

Inquiry & Purpose

(?) Inquiry / Higher Order Questions

Inquiry Questions Type Do complex numbers really exist? Debatable What are the applications of complex numbers?



Curriculum



Employ and refine their powers of abstraction and generalization

Objectives

Problem solving: Recall, select and use their knowledge of mathematical skills, results and models in both abstract and real-world contexts to solve problems.

Syllabus Content

Topic 1: Number and algebra

AHL Content

AHL 1.12

Complex numbers: the number i such that $i^2 = -1$. Cartesian form: z = a + bi; the terms real part, imaginary part, conjugate, modulus and argument.

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Calculate sums, differences, products, quotients, by hand and with technology. Calculating powers of complex numbers, in Cartesian form, with technology.

The complex plane.

Complex numbers as solutions to quadratic equations of the form $ax^2 + bx + c = 0$, with real coefficients where $b^2 - 4ac < 0$.

AHL 1.13

Modulus–argument (polar) form: $z = r(\cos \theta + i \sin \theta) = r c i s \theta$

Exponential form: $z=r\mathrm{e}^{\theta}$

Conversion between Cartesian, polar and exponential forms, by hand and with technology.

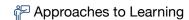
Calculate products, quotients and integer powers in polar or exponential forms.

Adding sinusoidal functions with the same frequencies but different phase shift angles.

Geometric interpretation of complex numbers.



ATL Skills





Thinking



Developing IB Learners





Inquirers



Knowledgeable



Thinkers