Summary

HL Quadratics

Subject	Year	Start date	Duration
Mathematics: applications and interpretation	IB1	Week 1, January	3 weeks

Course Part

Description

In this unit you will learn how to use quadratics to model real-life situations through both statistical and algebraic approaches.

Inquiry & Purpose

Inquiry / Higher Order Questions

Type	Inquiry Questions
Skills-based	How can a projectile be modelled as a quadtrac function?
Skills-based	What is the significance of a domain in a quadratic model when relating to real life situations?

Curriculum

Aims

Develop an understanding of the concepts, principles and nature of mathematics

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 2: Functions

SL Content

SL 2.3

The graph of a function; its equation $y = f(x)$

Creating a sketch from information given or a context, including transferring a graph from screen to paper.

Using technology to graph functions including their sums and differences.

SL 2.4

Determine key features of graphs.

Finding the point of intersection of two curves or lines using technology.

SL 2.5

Quadratic models. $f(x) = ax^2 + bx + c \quad ; \quad a \neq 0$. Axis of symmetry, vertex, zeros and roots, intercepts on the x-axis and y -axis.

Equation of a horizontal asymptote.

Direct/inverse variation: $f(x) = ax^n, \quad n \in \mathbb{Z}$

The y-axis as a vertical asymptote when $n < 0$.

Cubic models: $f(x) = ax^3 + bx^2 + cx + d$

Sinusoidal models: $f(x) = a\sin(bx) + d, \quad f(x) = a\cos(bx) + d$

AHL Content

AHL 2.8

Transformations of graphs.

Translations: $y = f(x) + b; y = f(x - a)$

Reflections: in the x-axis $y = -f(x)$, and in the y-axis $y = f(-x)$.

Vertical stretch with scale factor p: $y = pf(x)$

Horizontal stretch with scale factor $\frac{1}{q}$: $y = f(qx)$

Composite transformations.

ATL Skills

Approaches to Learning

Thinking

Communication

Developing IB Learners

Learner Profile

Inquirers

Knowledgeable

Thinkers