CAISL
Carlucci American International School of Lisbon

GRADE 12 CALCULUS, TRIGONOMETRY & PROBABILITY LEVEL 2 - IB MATH HIGHER LEVEL YEAR 2 FRAMEWORK

Contents

INTRODUCTION

This course caters for students with a good background in mathematics who are competent in a range of analytical and technical skills. The majority of these students will be expecting to include mathematics as a major component of their university studies, either as a subject in its own right or within courses such as physics, engineering and technology. Others may take this subject because they have a strong interest in mathematics and enjoy meeting its challenges and engaging with its problems.

PRIOR LEARNING TOPICS

It is expected that all students have extensive previous mathematical experiences, but these will vary.
In order to enroll in year two, students are expected to have successfully completed year 1 or an equivalent course.

EXPECTATIONS

INFORMATION TECHNOLOGY EXPECTATIONS

Graphic Display Calculator and Computer

Students are expected to use a graphic display calculator both in class and during assessments. The math department recommends the use of the TI – 84 plus model.

Students are also expected to use Geogebra or Excel to produce graphical representations or table of values. (https://www.geogebra.org/?lang=pt-PT)

PERFORMANCE INDICATORS

MATH PRACTICES

Explanations of Math Practices: By the end of the year students will be expected to problem solve, reason mathematically, and communicate efficiently according to grade level expectations. See link below: https://www.caislisbon.org/uploaded/Curriculum_links/Math/Math_Practice_Progressions_5-12.pdf

PROBLEM SOLVING

Make sense of problems and persevere in solving them
Look for and make use of structure (Deductive Reasoning)
Look for and express regularity in repeated reasoning (Inductive Reasoning)

MATHEMATICAL REASONING, COMMUNICATION, AND MODELING

Reason abstractly and quantitatively
Construct viable arguments and critique the reasoning of others
Model with mathematics
Use appropriate tools strategically
Attend to precision

MATH CONCEPTS

The student identifies, manipulates and classifies numbers. (Number and Number Sense)
Perform basic arithmetic and algebraic operations with matrices.
The student develops, chooses and uses appropriate methods to solve problems. (Computation/ Estimation)
Prove mathematical statements using mathematical induction.
Apply matrices to the task of solving systems of equations and using Gaussian row reduction to obtain information about consistency of the systems.

With three dimensional vectors, add, subtract, find scalar product, and vector product and use these operations in a variety of situations.

The student has a developed sense of spatial awareness. (Geometry)

Find vector, parametric, and Cartesian equations of three dimensional lines and planes.
Solve many problems involving intersections of lines and planes and distances from points to lines and planes.

The student finds associations between two variables and represents these algebraically and graphically. (Functions)

N/A

The student collects, analyzes and represents real world data, and analyzes chances of random occurrences (Probability and statistics)

Find mean, median, mode, variance, standard deviation of data.
Find quartiles from cumulative frequency graphs.
Solve basic probability problems involving tools such as Venn Diagrams, Tree Diagram, probability rules, and conditional probability.
Work with discrete distributions such as the binomial, negative binomial, Poisson, geometric, and hypergeometric.
Work with probability density functions.
Solve problems using the normal distribution and the exponential distribution.
Find confidence intervals.
Test hypotheses involving the mean and the mean of differences.
Use chi square to test goodness to fit and independence.

The student quantifies the world around him/her. (Measuring)

The student represents words using variables and applies operations to these. (Algebra)

The student identifies, analyzes and creates sequences according to a variety of attributes and properties. (Patterns & Classification)

Solve basic counting problems involving permutations and combinations.

ASSESSMENT

For students to receive a credit towards their High School Diploma, they must demonstrate proficiency on:

Summative assessments set by the class teacher which may take the form of

- in-class or out-of-class projects
- tests and quizzes which assess both knowledge and skill acquisition
- A final exam at the end of the year which covers material from the syllabus

Students who are pursuing the IB Diploma in addition to the High School Diploma must complete both years of the program and will submit the following works to the IBO which will assess them and determine the IB score awarded to the students for the IB Mathematics Standard Level course.

- In Year 2: produce an Internal Assessment (I.A.) which is a student initiated exploration which expands upon material covered in the syllabus and takes the form of a paper around 10 to 15 pages. The Internal Assessment is sent to the IBO for assessment and counts for 20% of the final IB Math SL grade.

. End-of-Course Exams written and scheduled by the IBO and administered at CAISL.

FURTHER CURRICULAR EXPECTATIONS

Notebook

- Math notebooks are an independent responsibility of the student.
- Students are expected to keep an organized notebook with notes from class, work done at home.

Scientific Writing

Students are expected to use the equation tool from word office to write all mathematical notation.