

The IB Diploma Programme, for students aged 16 to 19, is an academically challenging and balanced programme of education that prepares students for success at university and life beyond. Students take courses in six different subject groups, maintaining both breadth and depth of study. Mathematics standard level is in group 5, mathematics and computer sciences. In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

**About the IB:** For over 40 years the IB has built a reputation for high-quality, challenging programmes of education that develop internationally minded young people who are well prepared for the challenges of life in the 21st century and able to contribute to creating a better, more peaceful world.

The IB subject briefs illustrate four key course components in the IB Diploma Programme,

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## Overview of the mathematics standard level course and curriculum model

### I. Course description and aims

The IB Diploma Programme mathematics standard level course is for students with knowledge of basic mathematical concepts who are able to apply simple mathematical techniques correctly. The course provides students with a sound mathematical background to prepare for future studies in subjects such as chemistry, economics, psychology and business administration. Students will be introduced to important mathematical concepts through the development of mathematical techniques in a way that emphasizes subject comprehension rather than mathematical rigour. Students should, where possible, apply the acquired mathematical knowledge to solve realistic problems. In addition, the course will enable students to:

- appreciate the multicultural and historical perspectives of all group 5 courses
- enjoy the courses and develop an appreciation of the elegance, power and usefulness of the subjects
- develop logical, critical and creative thinking
- develop an understanding of the principles and nature of the subject
- employ and refine their powers of abstraction and generalization
- develop patience and persistence in problem solving
- appreciate the consequences arising from technological developments
- transfer skills to alternative situations and to future developments
- communicate clearly and confidently in a variety of contexts
- appreciate the multiplicity of cultural and historical perspectives of mathematics, including the international dimension of mathematics.

### II. Curriculum model overview

#### Mathematics standard level

Course		
<i>Core</i>	140 hours of instruction on seven topics <ul style="list-style-type: none"> <li>• Algebra</li> <li>• Functions and equations</li> <li>• Circular functions and trigonometry</li> <li>• Matrices</li> <li>• Vectors</li> <li>• Statistics and probability</li> <li>• Calculus</li> </ul>	140 hours
<i>Portfolio</i>	<ul style="list-style-type: none"> <li>• Two individual pieces of work, based on mathematical investigation and mathematical modeling</li> </ul>	10 hours
<b>Total teaching hours</b>		<b>150 hours</b>

### III. Assessment model

#### Assessment for mathematics standard level

The IB assesses student work as direct evidence of achievement against the stated goals of the Diploma Programme courses, which are to provide students with:

- a broad and balanced, yet academically demanding, programme of study
- the development of critical-thinking and reflective skills
- the development of research skills
- the development of independent learning skills
- the development of intercultural understanding
- a globally recognized university entrance qualification.

## Assessment for mathematics standard level (continued)

The assessments aim to test all students' knowledge and understanding of key concepts through various activities that demonstrate their ability to:

- read, interpret and solve a given problem using appropriate mathematical terms
- organize and present information and data in tabular, graphical and/or diagrammatic forms
- know and use appropriate notation and terminology
- formulate a mathematical argument and communicate it clearly
- select and use appropriate mathematical strategies and techniques
- demonstrate an understanding of both the significance and the reasonableness of results
- recognize patterns and structures in a variety of situations, and make generalizations
- recognize and demonstrate an understanding of the practical applications of mathematics
- use appropriate technological devices as mathematical tools
- demonstrate an understanding of and the appropriate use of mathematical modelling.

Students' success in the mathematics standard level course is measured by combining their grades on an external and internal assessment.

The internal assessment is of each student's portfolio, which consists of two pieces of work demonstrating ability in mathematical investigation, to highlight that investigation is fundamental to the study of mathematics, and mathematical modelling, to translate a real-world problem into mathematics.

## Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
<b>External</b>			<b>80</b>
<i>Paper 1</i>	Short- and extended-response questions	1.5	40
<i>Paper 2</i>	Short- and extended-response questions (graphic display calculator required)	1.5	40
<b>Internal</b>			<b>20</b>
<i>Portfolio</i>	Two pieces of work on different areas of the syllabus representing mathematical investigation and mathematical modelling		

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## IV. Sample questions

The following questions appeared in previous IB Diploma Programme mathematics standard level examinations.\*

1. Find the equation of the tangent to the curve  $y = e^{2x}$  at the point where  $x = 1$ .  
Give your answer in terms of  $e^2$ . (Paper 1)

2. The speeds of cars at a certain point on a straight road are normally distributed with mean  $\mu$  and standard deviation  $\sigma$ . 15 % of the cars travelled at speeds greater than  $90 \text{ kmh}^{-1}$  and 12 % of them at speeds less than  $40 \text{ kmh}^{-1}$ . Find  $\mu$  and  $\sigma$ . (Paper 2)

\* the syllabus for examinations current until 2014

Learn more about how the IB Diploma Programme prepares students for success at university by going online to [www.ibo.org/universities](http://www.ibo.org/universities) or email us at [recognition@ibo.org](mailto:recognition@ibo.org).