



IGCSE

Mathematics

Introduction

Welcome to your Mathematics IGCSE course! This introduction contains all the information you need to be able to start your course, and you can also use it as a reference point as you work your way through all the modules.

Which Syllabus does this Course follow?

This course has been designed to match the requirements of the Edexcel Specification A (4MA0).

The International General Certificate of Secondary Education (IGCSE) enables students to develop their mathematical knowledge and skills in a way which encourages confidence and provides satisfaction and enjoyment. The course encourages students to make use of Mathematics in other subjects and to provide a firm foundation for the further study of Mathematics and other disciplines. Students who obtain an IGCSE qualification from Edexcel are prepared for further academic success, including progression to A and AS Level study, and equipped with the skills needed for immediate employment, IGCSE is recognised as evidence of ability by academic institutions around the world.

The Edexcel syllabus is highly suitable for 'external' students – those not in full-time school-based education, e.g. someone studying part time by open learning, flexistudy, correspondence course, or someone being home-schooled.

The OOL Course is suitable for students aiming for Higher Tier exams (grades A* – E). Students following this course will therefore sit two Higher Tier examinations, papers 1 and 2 (see page 7 of this introduction for details).



Arrangement of Lessons

Module 1: Numbers

Lesson	Subject
1	Numbers
2	Prime Numbers, Factors and Fractions
3	Decimals, Approximations and Accuracy
4	Indices and Standard Form

Tutor-Marked Assignment A

Module 2: Money

5	Ratios and Percentages
6	Interest
7	Other Money Matters

Module 3: Measurement

8	Time, Distance and Speed
9	Measurements and Money

Tutor-Marked Assignment B

Module 4: Basic Algebra

10	Basic Algebra
11	Factorisation
12	Fractions and Equations
13	Equations in Action; Formulae
14	Inequalities and Accuracy

Tutor-Marked Assignment C

Module 5: Basic Geometry

15	Angles, Straight Lines and Symmetry
16	Triangles
17	Quadrilaterals and Polygons
18	Transformations
19	The Circle

Tutor-Marked Assignment D

Module 6: Further Geometry and Trigonometry

20	Mensuration
21	Geometrical Constructions and Solid Figures
22	Nets
23	Capacity and Volume

Tutor-Marked Assignment E**Module 7: Graphwork and Statistics**

- 24 Tables and Diagrams
- 25 Graphs and Gradients
- 26 Plotting Graphs
- 27 Further Graphwork
- 28 Statistics

Tutor-Marked Assignment F**Module 8: Probability and Experimental Work**

- 29 Experiments and Surveys
- 30 Probability
- 31 Testing a Hypothesis

Tutor-Marked Assignment G**Module 9: Further Numbers and Equations**

- 32 More on Numbers
- 33 Solving Equations
- 34 Sine and Cosine Graphs
- 35 Formulae and Fractions
- 36 Brackets, Indices, etc

Tutor-Marked Assignment H**Module 10: Advanced Geometry and Trigonometry**

- 37 Further Geometry
- 38 Chords, Tangents and Polygons
- 39 Trigonometry (1)
- 40 Trigonometry (2): Bearings
- 41 Trigonometry (3)
- 42 Gradients, Velocity and Acceleration

Module 11: Further Statistics and Number Work

- 43 Cumulative Frequency
 - 44 Sets
 - 45 Functions
- Tutor-Marked Assignment I**
- 46 Samples and Spreadsheets

Module 12: Your Exam

- 47 Revision for your Examination
- Tutor-Marked Assignments J and K**

How to Study this Course

Start with Module One, Lesson One and work your way through the course materials. The first page of each lesson sets out the aims and context of the lesson. After looking at this, you should simply start reading the lesson and follow the instructions given.

Additional Textbooks

The course contains a number of tests and activities, sufficient for most students to do well in the examination. However if you feel you need more practice or an alternative viewpoint, we can recommend the following textbook:

Dave Capewell, Peter Mullarkey & Katherine Pate: *GCSE Maths in a Year (Student Book)*, published by OUP (ISBN 978-0199151561).

It is *not* compulsory to purchase this text or any other. One easy way to buy supporting texts is through the OOL website (www.ool.co.uk). You may also choose to buy another textbook that is specifically aimed at a lower level. You could use this for extra practice. There are a variety of other textbooks available, and the answers to problems are usually given in the book, so you can check your own work.

Understanding Basic Ideas

The IGCSE places great emphasis on ‘doing Mathematics’ and relating this, wherever possible, to everyday life. Certain techniques and formulae need to be learnt, but the emphasis on ‘doing’ means that you should work carefully through all the examples and exercises in order to be able to solve problems effectively.

Activities

There are a number of activities in each of the lessons. These are placed in special boxes so that you don’t miss them. Space is given underneath most questions for you to attempt your answer. The pencil icon is a reminder that you are expected to do some writing. Please do not ignore any activity just because you think you understand the topic already. Practice is vital!

Where appropriate, suggested answers to the activity are to be found at the end of the lesson. Try not to look at the answers to activities before you have had a go at working them out for yourself.

Do make a habit of checking the answers after you have done the activities.

Don't be discouraged if your answers aren't right first time. Mistakes are one of the best means of helping you to identify what you need to learn. Study the suggested answer, go back and study the method again in the course materials or textbook, and if you can't understand, contact your tutor.

Your Tutor

Maths is a subject in which it is vital to make good use of your tutor. No matter how good you are, you are bound to hit a brick wall every so often where a topic does not seem to make sense, no matter how many times you work through it. There is no need to feel that you have failed or that your tutor will think any the worse of you if you ask for guidance. Quite the reverse. Often it will only take a couple of minutes to supply the missing link and set you on the right course.

Tutor-Marked Assignments (TMAs)

There will be a series of tutor-marked assignments (TMAs for short) throughout the course, usually after every three or four lessons or at the end of a module. These tests should be tackled under exam conditions.

You should send your answers to your tutor, with a cover sheet clearly indicating your name and study programme. Your tutor will mark and return your script, and you will be sent specimen answers. The tests are all to be found at the relevant point in the course.

When you start the course, keep your sights firmly set on the first TMA. It is very satisfying to complete it and send it off, and it gives your tutor a vital indication of how he or she can help you.

Equipment

- You will need a ruler with metric markings (centimetres), a protractor, and a pair of compasses. For graph work, you will need some squared paper, which is available from most stationers.
- **Electronic calculator.** A calculator should be used in both of the examinations, so it is important that you become familiar with the operation of your calculator at

an early stage. As a minimum, it should have the following functions:

$$\begin{array}{cccc} + & - & \times & \div \\ \pi & x^2 & \sqrt{x} & \frac{1}{x} \end{array}$$

Also: sine, cosine, tangent and their inverses in degrees.

If you ask for a calculator 'for GCSE Maths', most shops will be able to help. Please bear in mind that algebraic or graphical calculators are not permitted in the exam.

Planning Your Work

Think about when you might take the exam and work out how many study weeks you have left. This will give you an idea of how many weeks you might allow for each lesson. (The lessons do vary in length and you will find some easier than others, depending on your previous experience.) As you progress with the course, you will have a better idea of how long you need and how much you can fit into the time available.

Working Habits

Here are a few tips to help you make the most of your study.

1. Always show all your working. If you can do a problem in your head, you should still write down how you did it. In the examination, you will get marks for showing that you understand the method as well as for using it accurately. If you make an arithmetical error, you will still get marks for using the correct method. (If you get the answer wrong and don't show your method, you won't get any marks.)
2. Set your work out neatly, one step at a time. This really helps you to organise your thinking, which is essential, especially in longer activities.
3. Do lots of examples of each technique. Different questions give you a chance to practise the different variations of a problem, and this helps to make you more skilled and flexible in your work.
4. Make a list of mathematical words and their meanings as you come across them in each lesson. This helps you to remember technical vocabulary and will be extremely useful when you come to revise. It is also very rewarding to see just how many concepts you have mastered!

Syllabus and Examinations

The Edexcel Specification 4MA0 - Foundation or Higher?

Students following the Edexcel syllabus (or “specification”) take two written papers. There is no coursework.

The subject code for exam entry is 4MA0. This gives you a choice between the Foundation and Higher Tiers. If you take the Higher Tier, you will face some harder topics but if you take the Foundation Tier, you cannot be awarded the top grades. Don't worry – you do not need to decide immediately. Your tutor should advise you on the basis of your progress in the early modules of the course. The Foundation Level topics are contained in the first eight modules, so you may stop at the end of Module Eight.

Eventually, you will *either* sit Paper 1F and 2F *or* you will sit Paper 3H and 4H. Questions in the Foundation Tier papers are targeted at grades in the range C – G. The highest grade which will be awarded at Foundation Tier is grade C.

Questions in the Higher Tier papers are targeted at grades in the range A*– D. There is a ‘safety net’ grade E for students who narrowly fail to achieve grade D. There may be some questions common to both Foundation and Higher Tier papers. All papers are two hours long and marked by Edexcel.

The Specification Objectives

The Edexcel IGCSE in Mathematics (Specification A) qualification is designed to enable students to:

- develop their knowledge and understanding of mathematical concepts and techniques
- acquire a foundation of mathematical skills for further study in the subject or related areas
- enjoy using and applying mathematical techniques and concepts, and become confident to
- use mathematics to solve problems
- appreciate the importance of mathematics in society, employment and study.

Examination Structure

First Examination: Paper 1F or 3H

2 hours – 50% of the total marks

Second Examination: Paper 2F or 4H

2 hours – 50% of the total marks

In all examination papers:

- diagrams will not necessarily be drawn to scale and measurements should not be taken from diagrams unless instructions to this effect are given
- each student may be required to use mathematical instruments, e.g. pair of compasses, ruler, protractor
- calculators may be used
- tracing paper may be used
- formulae sheets will be provided.

Studying the Syllabus

The Edexcel IGCSE Mathematics specification 4MA0 can be viewed or downloaded from:

<http://www.edexcel.com/quals/igcse/igcse09/maths/mathsA/Pages/default.aspx>

We advise that you obtain a copy of the syllabus so that you can assess which topics you have covered in the most detail and which ones you will feel happiest about in the exam. Edexcel can also provide lots of other resources for your course. As you approach the examination, it will be helpful to look at the website (see in particular, Examzone) and see what is available.

Knowledge, Skills and Understanding

This Edexcel IGCSE in Mathematics (Specification A) requires students to demonstrate application and understanding of the following.

Number

- Use numerical skills in a purely mathematical way and in real-life situations.

Algebra

- Use letters as equivalent to numbers and as variables.
- Understand the distinction between expressions, equations and formulae.
- Use algebra to set up and solve problems.
- Demonstrate manipulative skills.
- Construct and use graphs.

Geometry

- Use properties of angles.
- Understand a range of transformations.
- Work within the metric system.
- Understand ideas of space and shape.
- Use ruler, compasses and protractor appropriately.

Statistics

- Understand basic ideas of statistical averages.
- Use a range of statistical techniques.
- Use basic ideas of probability.

Using the Internet

All students would benefit from access to the Internet. You will find a wealth of information on all the topics in your course. As well as the CIE website (www.cie.org.uk), you should get into the habit of checking the Oxford Open Learning site (www.ool.co.uk) where you may find news, additional resources and interactive features as time goes by. If you have not already done so, you may register for your free copy of *How to Study at Home*, our 200-page guide to home learning, or enrol on further courses. Put it on your favourites list now!

Good luck with the course!

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