

Maths
GCSE

Standard Course: Introduction

Welcome to your Mathematics GCSE 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 Assessment and Qualifications Alliance (AQA) syllabus 3301.

The AQA syllabus has been chosen as being the most suitable of those currently available for an 'external' student. An external candidate is usually someone who is not in full-time education, e.g. someone studying part time by open learning, flexistudy, correspondence course, etc.

Examination Tiers

In a subject like maths, it is very difficult to produce an exam that tests the skills of all students, from the most able to the weakest. In order to overcome this problem, the exam boards set three different groups of exams, for students of different abilities. When you come to take your exams, you have a choice as to which level of difficulty you aim for.

There are three levels of difficulty, or 'tiers of assessment': Foundation, Intermediate and Higher. The Higher tier exams are for students who hope to achieve grades A* to C (A* is a relatively new grade, which is higher than an A; it was introduced because too many GCSE students were achieving grade A); the Intermediate tier is for those who are aiming for grades B to E; and the Foundation tier is for grades D to G.

In other words, if you take the Higher tier exams and fail to achieve a grade C, you will not pass the exam, and the same

applies if you take the Intermediate tier and fall below a grade E. When the time comes to apply to sit your exams, you will need to make a realistic assessment of the grades you are capable of. Don't worry about this: your tutor will be able to help you decide nearer the time which is the most appropriate level for you.

Which Tier to Aim for?

The OOL Course is suitable for students aiming for Intermediate OR Higher Tier exams and it is not necessary to be certain at the outset which tier of exams you will eventually sit. You may find that the Higher Tier topics are too hard or you may be able to cope. The syllabus specifies certain topics which will only come up in Higher Tier examinations. Where these topics are covered in the course, you should find that these are marked "Higher Tier only". As these are generally harder, you are free to skip them and move on to the next lesson if you wish.

Standard Course: Arrangement of Lessons

Module 1: Numbers

Lesson	Subject	Greer Refs.	Exercises
1	Numbers	Ch. 1; Ch. 4, pp.35-37	1.1, 1.6
2	Prime Numbers, Factors and Fractions	Chs. 2-3	1.9, 2.3, 3.1-3.4
3	Decimals, Approximations and Accuracy	Ch. 1, Ch. 4, pp. 26-33	1.2, 4.1-4.3 Qs. 1-20
4	Indices and Standard Form	Ch. 20, pp. 153-56	20.1, 20.2 Qs. 1-23

Tutor-Marked Assignment A

Module 2: Money

Lesson	Subject	Greer Refs.	Exercises
5	Ratios and Percentages	Ch. 6, pp. 48–50, Ch. 7, pp. 57–59	6.1–3, 7.1–3
6	Interest	Ch. 9	9.1, 9.2 Qs. 1–8
7	Other Money Matters	Ch. 8, pp. 62–66; Ch. 10, pp. 76–81; Ch. 11, pp. 90–92	8.1 Qs. 1–5, 8.2 Qs. 1–6; 10.1, 10.3, Qs. 1–4, 6–7; 11.3, Misc. Exs. 6, 7

Module 3: Measurement

Lesson	Subject	Greer Refs.	Exercises
8	Time, Distance and Speed	Ch. 12	12.1, 12.3
9	Measurements and Money	(Ch. 5)	—

Tutor-Marked Assignment B

Module 4: Basic Algebra

Lesson	Subject	Greer Refs.	Exercises
10	Basic Algebra	Ch. 13, Ch. 27	13.1–5 27.8
11	Factorisation	Ch. 14, Ch. 19	14.1–3, 19.1

12	Fractions, Equations and Formulae	Ch. 15, Ch. 16, pp. 128– 131, Ch. 17	15.1, 2, 16.1–3, 17.1, 17.2 Qs. 1–20
13	Simultaneous Equations and Sequences	Ch. 18	18.1, 18.2

Tutor-Marked Assignment C

Module 5: Further Algebra

Lesson	Subject	Greer Refs.	Exercises
14	Inequalities and Accuracy	pp. 263-65	28.1, 28.2
15	Solving Equations	Ch. 19	19.2, 19.4-5

Tutor-Marked Assignment D

Module 6: Basic Geometry

Lesson	Subject	Greer Refs.	Exercises
16	Angles, Straight Lines and Symmetry	Ch. 32, pp. 327– 339, Ch. 33, pp. 327–339	32.1, 2, 33.1–3
17	Triangles	Ch. 34	34.1, 2, 34.4–6
18	Quadrilaterals, Polygons and Transformations	Ch. 35, Ch. 31, Ch. 41	35.1, 2 41.1-4
19	The Circle	(Ch. 36)	34.3, 36.1-3

Tutor-Marked Assignment E

Module 7: Further Geometry

Lesson	Subject	Greer Refs.	Exercises
20	Mensuration	Ch. 21, pp. 160–2	21.1
21	Geometrical Constructions and Solid Figures	Ch. 21, Chs. 33–36	21.2, 3 Qs. 4– 8, 33 Misc. Ex. A; 34.3, 35.3, 36.3
22	Nets	Ch. 36 (rest)	21.3, Q. 1–6
23	Loci	Ch. 37	37.1 Qs, 1, 2, 4, 5, 37.2 Qs. 1–4
24	Trigonometry	Ch. 38–40	38.1–6; 39.1; 40.1–3

Tutor-Marked Assignment F

Module 8: Statistics and Graphwork

Lesson	Subject	Greer Refs.	Exercises
25	From Tables to Graphs	Chs. 23–27 (relevant sections)	23.1–3, 24.1, 2, 25.1–4, 26.1
26	Function Notation and Graphwork	Ch. 24; Ch. 27	27.6–7
<i>Tutor-Marked Assignment G</i>			
27	Statistics	Ch. 42, pp. 467–478	42.1, 2, 3 Qs. 1–10

Module 9: Probability and Experimental Work

Lesson	Subject	Greer Refs.	Exercises
28	Probability	Ch. 43, pp. 494– 498, 500–2	43.1
29	Testing a Hypothesis <i>Tutor-Marked Assignment H</i>		None
30	Spreadsheets		None

Module 10: Further Algebra and Graphwork

Lesson	Subject	Greer Refs.	Exercises
31	Intersecting Graphs	Ch. 26	26.2, 26.3
32	Higher Algebra		16.3; 17.1-2; 15.1-2
33	Brackets, Indices, etc <i>Tutor-Marked Assignment I</i>	Ch. 14, Ch. 20	14.1-5

Module 11: Your Exam

Lesson	Subject	Greer Refs.
34	Revision for Papers 1 & 2	None
35	Practice for Coursework	None
36	Practice Examination Paper (TMA J) <i>Tutor-Marked Assignment J</i>	None

For specific details about reading references and exercises, see the lessons themselves.

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 simply start reading the lesson and follow the instructions given. Often you will be asked to use the accompanying textbook.

Accompanying Textbook

Although the course contains a number of tests and activities, you need as much practice as you can get, so the course runs parallel to the following textbook:

A. Greer: *A Complete GCSE Mathematics: Higher Course* 3rd edn, published by Stanley Thornes (Publishers), ISBN 0-7487-1389-1

One easy way to buy supporting texts is through the OOL website (www.ool.co.uk). It is essential that you do the reading and activities from the textbook in order to complete the course. You'll see that on the introduction page of each lesson, the relevant chapter numbers in Greer are given. You need not read the textbook at that point – just follow the lesson through, and the course materials will tell you exactly which parts of Greer to use. Sometimes all your work on a particular topic will be from the textbook.

Even if you are sure you want to sit the Intermediate-level examination, you still need to buy the Higher-level textbook, since all the references in the OOL course are to that book.

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.

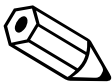
Understanding Basic Ideas

The GCSE 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 each question for you to attempt your answer. The pencil icon is a reminder that you are expected to do some writing.

Activity 1	The question will start here.
	Write your answer here.

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.

Some activities will require you to do exercises from the textbook. Answers to these will normally be found at the back of the textbook.

Try not to look at the answers to activities before you have had a go at working them out 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 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 where 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 make sense no matter how many times you work through it. There is no need to feel 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, 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 first start the course, keep your sights firmly set on the first TMA. It is very satisfying to see it done and send it off, and it gives your tutor a vital indication of how best he or she can help you.

Equipment

- Textbook, by Greer (see above).
- 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.** Since a calculator is allowed on one of the written exam papers, 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 advise you.

Planning Your Work

Think about when you might take the exam and work out how many study weeks you have available. That will give you a rough 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 you have 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 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 meaning as you come across them in each lesson. This helps you to remember the technical vocabulary and is extremely useful when you come to doing your revision. It is also very rewarding to see just how many concepts you have mastered!

Syllabus and Examinations

The AQA Syllabus

Students following the AQA syllabus take two written papers and also submit some coursework. You choose between the Foundation (F), Intermediate (I) and Higher (H) tiers. The subject codes for exam entry are as follows: Foundation tier (3301XF), Intermediate tier (3301XI) and Higher tier (3301XH).

The Assessment Objectives

There are four assessment objectives which must be covered by the course. You must demonstrate your knowledge, understanding and skills in the following areas:

Ma1 - Using and applying mathematics

This objective is covered in the context of the other three.

Ma2 - Number and algebra

- using and applying number and algebra
- numbers and the number system
- calculations
- solving numerical problems
- equations, formulae and identities
- sequences, functions and graphs

Ma3 - Shape, space and measures

- using and applying shape, space and measures
- geometric reasoning
- transformations and coordinates
- measures and construction

Ma4 - Handling data

- using and applying handling data
- specifying the problem and planning
- collecting data
- processing and representing data
- interpreting and discussing results

Examination Structure

Details are given here for the Intermediate and Higher tiers. The Foundation tier exams are slightly shorter in duration:

Paper 1 - 2 hours – 40% of the total marks

All Assessment Objectives are assessed. All questions are compulsory. Candidates should attempt all questions and there should be time for able candidates to complete all of them. Calculators are *not* allowed for Paper 1.

Paper 2 - 2 hours – 40% of the total marks

This has the same definition as Paper 1 except that calculators may be used.

Coursework – 20% of the total marks

This course has been designed to follow coursework option X, which means that candidates choose from a bank of tasks provided by AQA, and that AQA does the marking. Two tasks must be completed, each targeted at different Assessment Objectives.

The first task assesses attainment target Ma1 on the syllabus, 'using and applying mathematics'. There are three aspects to this. You must:

- make and monitor decisions to solve problems
- communicate mathematically
- develop skills of mathematical reasoning.

The assessment objective must be covered 'in the context' of either Ma2 or Ma3 (i.e. using a task covered in that subject area).

The second task must cover objective Ma4, 'handling data.' The three aspects which must be covered in this task are:

- specify the problem and plan
- collect, process and represent data
- interpret and discuss results

Your coursework has to be 'authenticated' by your tutor, who has to sign a form stating that it was all your own work. Whilst your tutor can advise you on which task to do and help

you to plan your investigation, the rest of the work must be undertaken on your own.

Revising for Your Exam

In your overall study plan, you need to allow time to go back over the course and revise all the different sections.

The final module of the OOL course, 'Your Exam', is designed to help you prepare for your exams. This module will guide you through the types of question you are likely to encounter in the two papers and ends with a practice examination paper, which you send to your tutor for marking in the same way as a tutor-marked assignment.

Oxford Open Learning would like to thank the former NEAB (now AQA) for their generosity in allowing us to reprint questions from their specimen examination papers.

Studying the Syllabus

You should be sure to acquire your own copy of the syllabus, either via the AQA Publications Dept or from the website www.aqa.org.uk. Be sure to get the syllabus for the right year!

The syllabus can be purchased from

Publications,
AQA, Aldon House,
39, Heald Grove,
Rusholme,
Manchester
M14 4NA (tel: 0161-953-1170)

or downloaded from www.aqa.org.uk/qual/pdf/AQA3301WSP.pdf.

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. AQA can also provide advice booklets on your course, including 'Information for Private Candidates'. As you approach the examination, it will also be helpful to purchase and tackle past papers from AQA.

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 AQA website (www.aqa.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!

Copyright © Oxford Open Learning 2002