# GCSE Mathematics

## Wigston Academy

A course guide
FOR PARENTS
2017-2019

## What is in this booklet?

The GCSE period is a stressful time for all students – but we realise that it can be a testing time for parents too. We've written this guide to try to give you a clearer picture of what your son/daughter will do in mathematics, what will be expected of them in the forthcoming exams and suggest some ways you can support in their work. If you have any questions, don't hesitate to get in touch with your son/daughter's teacher.

## What qualification are the students working towards?

The faculty follows AQA's GCSE Mathematics (8300) specification. All assessment is done in examinations at the end of Year 11.

There are two tiers of entry Higher (9 – 4) and Foundation (5 – 1). All examinations are 80 marks and 1 hour 30 minutes in length. All content from the specification can be assessed in any of the three papers.

Paper 1 – None Calculator
Paper 2 – Calculator
Paper 3 – Calculator

## What about tiers of entry and setting?

All students will have the opportunity to attain his/her target grade. Students in maths have been set using an average of year 9 test scores (60% weighting) and their GCSE target grade (40% weighting). Classes will be taught so that target grades of all students can be attained.

## How is the course covered and assessed?

Teachers will be following a 2 year scheme of learning adapted from published materials by the exam board (AQA). AQA have, at the moment, published sample assessment materials and mark schemes based on levels of attainment against the assessment objectives and not the final grades. We will be using these materials every half term throughout the two years to help judge students' progress and, therefore, identify areas of improvement.

Whilst the new (2013) Key Stage 3 Programme of Study is designed to enable smooth progression to the new GCSE, the current scheme of work has identifiable differences in both content and style which may lead to some gaps in the preparation of students. Our programme of study is designed to support teaching and learning for the cohorts of students who have studied the current (2007) Key Stage 3 Programme of Study and are preparing for the new Mathematics GCSE (8300 specification).

## Minor changes

| Topic | Content Outline | New KS3 PoS reference | New GCSE specification reference |
|---|---|---|---|
| Mathematical symbolism | Awareness of the symbols $=, \neq, <, >, \leqslant, \geqslant$<br>Previously listed under linear equations on current PoS. Teachers should emphasize correct and fluent use of these symbols. | Number section | N1 |
| Financial Mathematics | Some basic knowledge of financial terms e.g. debit, credit, balance. These are mentioned in section 1.3 and in 'calculations and manipulations with rational numbers' section of number and algebra of the current PoS. Providing an increased emphasis on financial terminology and contexts within questions will be beneficial. | Solve Problems section | N2 |
| Factors, multiples and primes | Fluency in identifying prime numbers and being aware of HCF and LCM are important preparation for the new GCSE. Some experience of prime factorisation would also be beneficial e.g. factor trees. This is not stressed in the current PoS. | Number section | N4 |
| Listing strategies | Emphasis on strategic listing and the need to be systematic is required. Not listed explicitly in current PoS but likely to have been addressed in probability experiments in current schemes of work. | Probability section | N5 |
| Powers and roots | Increased emphasis on what a power is and some experience of working with and calculating powers. Not listed explicitly in current PoS but likely to have been covered e.g. students will probably have met squares up to 15 x 15 or used powers during prime factor decomposition. | Number section | N6, N7 |

| Topic | Content Outline | New KS3 PoS reference | New GCSE specification reference |
|---|---|---|---|
| Exact answers | Students will benefit from having an awareness of the fact that a fractional answer can be more exact than an answer given in decimal form. This can be embedded where it naturally arises, for example when giving answers as a multiple of pi. | Not listed | N8, G17 |
| Standard Form | Students need a good working knowledge of powers and place value in order to access standard form at GCSE. | Number section | N9 |
| Rounding during calculations | This is not mentioned in the current or new KS3 PoS. Students need to be made aware of the need to round only the final answer and to keep all digits up to that point. This should be embedded into teaching strategies throughout all topics at KS3. | Not listed | N15 |
| Fractional coefficients | Students should be encouraged to avoid writing coefficients as decimals automatically – fractions are more accurate. This is not listed in the current PoS. | Algebra | A1 |
| Simplifying answers unprompted | Students should be encouraged to simplify all answers, particularly those involving algebra, without being prompted to do so. This can be embedded in teaching of all topics throughout KS3. | Not listed | A1 |
| Vocabulary expression, equation, formula, inequality, terms, factors and the word 'identity' | Some familiarity with the correct terminology for algebra would be expected prior to starting a GCSE course. This is not included in the current PoS. Correct use of terminology should be stressed. | Algebra | A3, A6 |
| Compare lengths, areas and volume using ratio notation | Not explicitly listed in 2007 PoS. At a basic level, students would benefit from being aware that physical measurements can be expressed in relation to each other using ratio. | Not listed | R12 |

| Topic | Content Outline | New KS3 PoS reference | New GCSE specification reference |
|---|---|---|---|
| Derive and use angle sum of a triangle | See also Section 3.<br>Not listed in 2007 PoS. Students need to be aware of the idea of formal proof rather than informal verification of a rule. It would be beneficial if students had some exposure to this prior to GCSE. | Geometry and Measures | G3, G6 |
| Vocabulary of 2D shapes | Students should use the correct words when working with shapes e.g. rhombus not diamond. This is not explicitly mentioned in PoS but students would benefit from opportunities to become familiar with the terminology listed in GCSE specification reference G4 being emphasized when they arise during KS3. | Geometry and Measures | G4 |
| Vocabulary of circles | Students should use the correct words when working with circles and parts of circles. This is not explicitly mentioned in the current PoS but students would benefit from opportunities to become familiar with the terminology listed in the GCSE specification reference G9 being emphasized when they arise during KS3. | Not listed | G9 |
| Terminology relating to solid shapes | Not explicitly mentioned in current PoS though students may know these terms. Euler's formula investigation would be a good activity to give KS3 students this introduction to the terminology. It would be helpful if students knew the terms vertices (vertex), edges and faces prior to starting a GCSE course. | Not listed | G12 |
| Knowing exact trigonometric ratios | Not explicitly mentioned in current PoS and not all students will have actually studied trigonometry at KS3. For students who are going to study trigonometry at KS3, an awareness that some 'special' angles have exact values for sin, cos or tan and to have come across these before would be beneficial. | Not listed | G21 |
| Frequency trees | Not listed in current PoS and new to GCSE specification. It would be helpful for students to see these at KS3. | Not listed | P1 |
| Probability terminology | Terminology such as exhaustive events, mutually exclusive event, independent / dependent events is not listed in current PoS; theoretical probability and experimental probability are listed but would benefit from emphasis prior to starting GCSE course. | Not listed | P4, P5, P8 |

| Topic | Content Outline | New KS3 PoS reference | New GCSE specification reference |
|---|---|---|---|
| Inferring properties of a population from a sample | Not listed in current PoS. Understanding what is meant by 'population' and 'sample' is good prior knowledge before starting a GCSE course. Being aware of the notion of making statements about a population based on a sample would be beneficial. | Not listed | S1, S5 |
| Statistical terminology | Not listed in current PoS. Being aware of the terms primary data, secondary data, discrete data, continuous data would be useful prior to starting a GCSE course | Not listed | S4 |
| Bivariate Data | Not listed on current PoS. Describing a relationship between two variables would be useful prior knowledge, using basic scatter graphs and describing the pattern observed. | Statistics | S6 |

## Major changes

| Topic | Content Outline | New KS3 PoS reference | New GCSE specification reference |
|---|---|---|---|
| Pocket 1: Working with fractions in ratio problems.<br>Express a multiplicative relationship between two quantities as a ratio<br>Relate ratios to fractions and to linear functions | Need a clear understanding of the difference between ratio and fractions and know, for example, that $\frac{1}{4}$ and 1:4 are not the same. Whilst fractions and ratio are addressed separately in the current PoS, it is the relationship between the two formats that is a new emphasis.<br>Knowing a number of ways to work with the concepts of ratio and proportion, other than simply dividing an amount in a given ratio, is important in the new GCSE specification and some prior experience of this is needed. | Ratio, proportion and rates of change | N10, N11, R6, R8 |
| Pocket 2: Function notation | This is not listed in 2007 PoS. Students may be used to 'function machines' and so conceptually understanding what a function is, but it is unlikely they will be aware of the formal f(x) notation; however, some familiarity with function notation would be desirable prior to starting the GCSE course | Not listed | A7 |
| Pocket 3: Graphs in real contexts | Not explicitly listed in current PoS; however, the new GCSE references kinematics, acceleration and speed – whilst it is possible that KS3 students will have met these in maths or science, it cannot be assumed. Graphs in financial contexts are also mentioned for GCSE so some prior knowledge of these would be beneficial. | Not listed | A14, A15 |

| Topic | Content Outline | New KS3 PoS reference | New GCSE specification reference |
|---|---|---|---|
| Pocket 4: Iterative methods for solving equations numerically | Only trial and improvement is mentioned as a numerical approach and no other iterative methods are referred to in current PoS. Students progressing to the higher tier would benefit from being aware of the idea of a numerical approach to solving equations and having a basic awareness of an iterative formula | Not listed | A20, R16 |
| Pocket 5: Using set notation and number lines to represent solution to an inequality.<br>Venn diagrams | Set notation not listed in current PoS and students are unlikely to be familiar with it. Number lines are likely to be a familiar concept and it is likely they could easily adapt prior knowledge to representing the solution of an inequality.<br>Awareness of Venn diagrams and basic usage is essential prior to commencing a GCSE course and this sits naturally with an the introduction to set notation. Tree diagrams might be introduced at a basic level too. | Set notation Not listed<br>Venn diagrams in Probability | A22, P6 |
| Pocket 6: Triangular, square and cube numbers and the terms 'arithmetic progression' and 'geometric progression'. Fibonacci and quadratic sequences | Specific named sequences not listed in current PoS. Awareness of well-known sequences would be beneficial. Correct terminology of 'arithmetic progression' useful but not essential prior to starting GCSE.<br>Knowing there are other ways to generate a sequence than those with the same difference each time is important. | Algebra | A24, A25 |
| Pocket 7: Solve problems involving direct and inverse proportion including graphical and algebraic representations | Not explicitly listed in current PoS and unlikely to have been a specific focus. Knowing a number of ways to work with the concepts of ratio and proportion, other than simply dividing an amount in a given ratio, is important in the new GCSE specification and some prior experience of this is needed. Curved graphs only needed for students progressing to higher tier. | Ratio, proportion and rates of change | R10, R13, R14, R15 |

## What support does Wigston Academy give to the students?

The first port of call for a student if they are struggling with any aspect of the course should be their Maths teacher who will know exactly what they need to do in order to improve. There will also be a series of intervention groups which will help pupils to secure specific skills needed to be successful in the exams. In addition, there will be 'drop-in' sessions so students can speak to a specialist teacher for some occasional help when needed.

## What other resources are available?

Revision guides and support materials are now available – the CGP guides are quite useful. They can be purchased from the department as well as the CGP workbook.

The school subscribe to several supportive websites with lesson guides and video links to support the development of students in specific areas. These websites are important for individuals to focus on their own personal areas for development.

www.mymaths.co.uk
Username – Wigston1
Password – square177

www.hegartymaths.com
www.bigbrainmaths.com
www.studymaths.co.uk

PiXL Maths APP!

I hope that you have found this booklet useful. If you have any questions about your son/daughter's Maths GCSE or want to know about their progress, please contact their Maths teacher or Mr Ashton (Head of Mathematics) mashton@wigstonmat.org or 0116 2881228

We thank you for your support.

*The Mathematics Department*
Wigston Academy