The Queen Katharine Maths Department
For our students we seek to be the best

GCSE Maths

Course and Revision Information Booklet

The Maths GCSE qualification at a glance

- o **Exam board: Edexcel**
- o **Subject code: 1MA1.**

- The assessments will cover the following content headings:
    1. Number
    2. Algebra
    3. Ratio, proportion and rates of change
    4. Geometry and measures
    5. Probability
    6. Statistics

- Two tiers are available: **Foundation** and **Higher** (content is defined for each tier).

- Each student is permitted to take assessments in either the Foundation tier or Higher tier.

- The qualification consists of three equally-weighted written examination papers at either Foundation tier or Higher tier.

- All three papers must be at the same tier of entry and must be completed in the same assessment series.

- Paper 1 is a non-calculator assessment.

- A calculator is allowed for Paper 2 and Paper 3.

- Each paper is 1 hour and 30 minutes long.

- Each paper has 80 marks.

- The content outlined for each tier will be assessed across all three papers.

- Each paper has a range of question types; some questions will be set in both mathematical and non-mathematical contexts.

- The qualification will be graded and certificated on a nine-grade scale from 9 to 1 using the total mark across all three papers where 9 is the highest grade. Individual papers are not graded.

- Foundation tier: grades 1 to 5.

- Higher tier: grades 4 to 9.

GCSE Mathematics Assessment Breakdown:

Paper 1	*Paper code: 1MA1/1F or 1MA1/1H
• Externally assessed • Availability: May/June and November** • First assessment: May/June 2017	**33.33% of the total GCSE**

Overview of content

1. Number
2. Algebra
3. Ratio, proportion and rates of change
4. Geometry and measures
5. Probability
6. Statistics

Overview of assessment

- Written examination papers with a range of question types
- No calculator is allowed
- 1 hour and 30 minutes (both Foundation and Higher tier papers)
- 80 marks available

Exam date:

21st May 2019

Paper 2	*Paper code: 1MA1/2F or 1MA1/2H
• Externally assessed • Availability: May/June and November** • First assessment: May/June 2017	**33.33% of the total GCSE**

Overview of content

1. Number
2. Algebra
3. Ratio, proportion and rates of change
4. Geometry and measures
5. Probability
6. Statistics

Overview of assessment

- Written examination papers with a range of question types
- Calculator allowed
- 1 hour and 30 minutes (both Foundation and Higher tier papers)
- 80 marks available

Exam date:

6th June 2019

Paper 3	*Paper code: 1MA1/3F or 1MA1/3H
• Externally assessed • Availability: May/June and November** • First assessment: May/June 2017	**33.33% of the total GCSE**

Overview of content

1. Number
2. Algebra
3. Ratio, proportion and rates of change
4. Geometry and measures
5. Probability
6. Statistics

Overview of assessment

- Written examination papers with a range of question types
- Calculator allowed
- 1 hour and 30 minutes (both Foundation and Higher tier papers)
- 80 marks available

Exam date:

11th June 2019

What you need to know

Higher Specification

Grades 8/9

Title	Topic
Upper and Lower Bounds	Number
Surds – Introduction, expressions, rationalising the denominator	Number
Perpendicular Lines	Algebra
Completing the Square – Basics, solving, sketching	Algebra
Algebraic Fractions – Simplifying and Solving	Algebra
Simultaneous Equations with a Quadratic	Algebra
Solve Quadratic Inequalities	Algebra
Finding the nth Term of a Quadratic	Algebra
Inverse Functions - I	Algebra
Composite Functions	Algebra
Veocity-Time Graphs	Algebra
Pythagoras in 3D	Geometry
Trigonometry in 3D	Geometry
Vectors	Geometry

Grade 7

Title	Topic
Fractional Indices	Number
Recurring Decimals - Proof	Number
Rearranging difficult Formulae	Algebra
Solving Quadratics with the Formula	Algebra
Factorising Hard Quadratics	Algebra
Algebraic Proof	Algebra
Exponential Functions	Algebra
Trigonometric Graphs - Sine and Cosine	Algebra
Trigonometric Graphs - Tangent	Algebra
Transformation of Functions - Polynomial Functions	Algebra
Transformation of Functions - Trigonometric Functions	Algebra
Equation of a Circle	Algebra
Regions	Algebra
Direct and Inverse Proportion	Ratio
Similarity - Area and Volume	Geometry
The Sine Rule	Geometry
The Cosine Rule	Geometry
Area of a Triangle Using Sine	Geometry
And and Or Probability Questions	Probability
Histograms	Probability

Grade 6

Title	Topic
Recurring Decimals to Fractions	Number
Product of Three Binomials	Algebra
Iteration - Trial and Improvement	Algebra
Iterative Processes	Algebra
Enlargement - Negative Scale Factor - Using Construction Lines	Geometry
Enlargement - Negative Scale Factor - Using Column Vectors	Geometry
Combinations of Transformations	Geometry
Circle Theorems / proof	Geometry
Probability using Venn Diagrams	Probability
Cumulative Frequency	Probability
Boxplots	Probability

Foundation and Higher

Grade 5

Title	Topic
Negative Indices	Number
Error Intervals	Number
Mathematical Reasoning	Number
Factorising and Solving Quadratics	Algebra
The Difference of Two Squares	Algebra
Finding the Equation of a Straight Line - y=mx+c	Algebra
Finding the Equation of a Straight Line - Gradient and Coordinates	Algebra
Roots and Turning Points of Quadratics	Algebra
Cubic and Reciprocal Graphs	Algebra
Simultaneous Equations Algebraically	Algebra
Geometric Progressions	Algebra
Compound Interest and Depreciation	Ratio
Loci	Geometry
Congruent triangles	Geometry
Sectors of a Circle	Geometry
Trigonometry	Geometry
Spheres	Geometry
Pyramids	Geometry
Cones	Geometry
Frustums	Geometry
Exact Trigonometric Values	Geometry
Introduction to Vectors	Geometry
Harder Tree Diagrams	Probability
Stratified sampling	Probability

Grade 4

Title	Topic
Index Notation	Number
Introduction to Bounds	Number
Midpoint of a Line on a Graph	Algebra
Expanding and Simplifying Brackets - Single Set of Brackets	Algebra
Expanding and Simplifying Brackets - Double Set of Brackets	Algebra
Solving Equations - Balancing	Algebra
Solving Equations - Float & Ping	Algebra
Rearranging Simple Formulae	Algebra
Forming Formulae and Equations	Algebra
Inequalities on a Number Line	Algebra
Solve Linear Inequalities	Algebra
Simultaneous Equations Graphically	Algebra
Fibonacci Sequences	Algebra
Compound Units	Ratio
Distance-Time Graphs	Ratio
Similar Shapes	Ratio
Bisecting an Angle	Geometry
Constructing Perpendiculars - Bisecting a Line	Geometry
Constructing Perpendiculars - From any Point	Geometry
Draw a Triangle Using Compasses	Geometry
Enlargements	Geometry
Tangents, Arcs, Sectors and Segments	Geometry
Pythagoras' Theorem - A Simple Approach	Geometry
Pythagoras' Theorem - An Algebraic Approach	Geometry
Pythagoras' Theorem - Line on a Graph	Geometry
Simple Tree Diagrams	Probability
Sampling Populations	Probability
Time Series	Probability

Grade 3

Title	Topic
Multiplying and Dividing Decimals	Number
Four Rules of Negatives – Adding, Subtracting, Multiplying and Dividing	Number
Listing Strategies	Number
Comparing Fractions	Number

Title	Topic
Adding and Subtracting Fractions - Standard and Alternative Methods	Number
Finding a Fraction of an Amount	Number
Multiplying and Dividing Fractions	Number
BODMAS/BIDMAS	Number
Reciprocals	Number
Calculator Questions	Number
Product of Primes	Number
Highest Common Factor (HCF)	Number
Lowest Common Multiple (LCM)	Number
Squares, Cubes and Roots	Number
Working with Indices	Number
Standard Form	Number
Decimals and Fractions	Number
Fractions, Percentages, Decimals	Number
Percentage of an Amount	Number
Change to a Percentage	Number
Rounding to Significant Figures	Number
Estimating Answers	Number
Using Place Value	Number
Expanding Brackets	Algebra
Simple Factorisation	Algebra
Substitution	Algebra
Straight Line Graphs	Algebra
The Gradient of a Line	Algebra
Drawing Quadratic Graphs	Algebra
Sketching Graphs	Algebra
Solving Equations using Flowcharts	Algebra
Subject of a Formula using Flowcharts	Algebra
Generating a Sequence from the nth Term	Algebra
Finding the nth Term	Algebra
Special Sequences	Algebra
Exchanging Money	Ratio
Sharing using Ratio	Ratio
Ratios, Fractions and Graphs	Ratio
Increase/Decrease by a Percentage	Ratio
Percentage Change	Ratio
Reverse Percentage Problems	Ratio
Simple Interest	Ratio
Metric conversions	Geometry
Problems on Coordinate Axes	Geometry
Surface Area of a Prism - Cuboids	Geometry
Surface Area of a Prism - Triangular Prisms	Geometry
Volume of a Cuboid	Geometry
Circle Definitions	Geometry
Area of a Circle	Geometry
Circumference of a Circle	Geometry
Volume of a Prism	Geometry
Angles and Parallel Lines	Geometry
Angles in a Triangle	Geometry
Properties of Special Triangles	Geometry
Angle Sum of Polygons	Geometry
Bearings	Geometry
Experimental Probabilities	Probability
Possibility Spaces	Probability
Venn Diagrams - Introduction	Probability
Venn Diagrams - Notation	Probability
Representing Data - Pie Charts	Probability
Representing Data - Stem and Leaf Diagrams	Probability
Scatter Diagrams	Probability
Averages from a table - Basics	Probability
Averages from a table - Estimate for the Mean	Probability

Grade 2

Title	Topic
Adding Integers and Decimals	Number
Subtracting Integers and Decimals	Number
Multiplying Integers	Number
Dividing Integers	Number
Inverse Operations	Number
Money Questions - Non-Calculator Questions	Number

Title	Topic
Money Questions - Calculator Questions	Number
Negatives in Real Life	Number
Introduction to Fractions	Number
Equivalent Fractions	Number
Simplifying Fractions	Number
Half-Way Values	Number
Factors, Multiples and Primes	Number
Introduction to Powers/Indices	Number
Multiplying and Dividing by Powers of 10	Number
Rounding to the Nearest 10, 100, 1000	Number
Rounding to Decimal places	Number
Simplifying - Addition and Subtraction	Algebra
Simplifying - Multiplication	Algebra
Simplifying - Division	Algebra
Function Machines	Algebra
Generating a Sequence - Term to Term	Algebra
Introduction to Ratio	Ratio
Using Ratio for Recipe Questions	Ratio
Introduction to Percentages	Ratio
Value for Money	Ratio
Simple Proportion	Ratio
Properties of Solids	Geometry
Nets	Geometry
Angles on a Line and at a Point	Geometry
Measuring and drawing Angles - Measuring	Geometry
Measuring and drawing Angles - Drawing	Geometry
Drawing a Triangle Using a Protractor	Geometry
Reflections	Geometry
Rotations	Geometry
Translations	Geometry
Plans and Elevations	Geometry
Perimeters	Geometry
Area of a Rectangle	Geometry
Area of a Triangle	Geometry
Area of a Parallelogram	Geometry
Area of a Trapezium	Geometry
Frequency Trees	Probability
Listing Outcomes	Probability
Calculating Probabilities	Probability
Mutually Exclusive Events	Probability
Two-Way Tables	Probability
Averages and the Range	Probability
Data - Discrete and Continuous	Probability
Vertical Line Charts	Probability
Frequency Tables and Diagrams	Probability

Grade 1

Title	Topic
Place Value	Number
Ordering Integers	Number
Ordering Decimals	Number
Reading Scales	Number
Simple Mathematical Notation	Number
Interpreting Real-Life Tables - Time	Number
Interpreting Real-Life Tables - Timetables and Distance Tables	Number
Introduction to Algebraic Conventions	Algebra
Coordinates	Algebra
Simple Geometric Definitions	Geometry
Polygons	Geometry
Symmetries	Geometry
Tessellations and Congruency - Tessellations	Geometry
Tessellations and Congruency - Congruent Shapes	Geometry
Names of Angles	Geometry
The Probability Scale	Probability
Tally Charts and Bar Charts	Probability
Pictograms	Probability

Formulae Sheet

Perimeter, area, surface area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

Curved surface area of a cone $= \pi r l$

Surface area of a sphere $= 4\pi r^2$

Volume of a sphere $= \frac{4}{3}\pi r^3$

Volume of a cone $= \frac{1}{3}\pi r^2 h$

Kinematics formulae

Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

Formulas You Need to Know for The Foundation **and** Higher Exams

Area of a triangle $= \dfrac{b \times h}{2}$
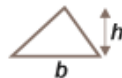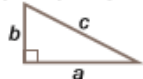
Area of trapezium $= \frac{1}{2}(a + b)h$
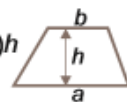
Area of a circle $= \pi r^2$
Circumference of a circle $= 2\pi r$

Pythagoras' Theorem

$a^2 + b^2 = c^2$

Trigonometry

Formulas You Need to Know for The Higher Exam ONLY

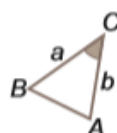Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Sine Rule

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Cosine Rule

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Area of a Triangle $= \frac{1}{2}ab \sin C$

6 Week Revision Plan - MathsWatch

Higher Specification

	Number	Algebra	Ratio & Proportion	Geometry & Measures	Probability & Stats	Total time of clips	Grade
MON	32			48, 49, 50, 54, 55, 56		7 mins	2
TUE	66, 67, 68, 69	93, 94, 95	105	112		9 mins	3
WED	70, 71, 72, 73, 74	96, 97	106			8 mins	3
THU	75, 76, 77	98, 99	107	113		7 mins	3
FRI	78, 79, 80	100, 101		114a/b, 115		8 mins	3
MON	81, 82, 83	102, 103, 104			125, 126	8 mins	3
TUE	84, 85			116, 117, 118, 119	127a/b	8 mins	3
WED	86, 87, 88, 89		108, 109, 110, 111		128, 129	10 mins	3
THU	90, 91, 92			120, 121, 122, 123, 124	130a/b	10 mins	3
FRI	131, 132	133		145, 146a/b, 147		7 mins	4
MON		134a/b, 135(a or b)	142, 143	148		6 mins	4
TUE		136, 137	144	149		4 mins	4
WED		138, 139, 140, 141			151	5 mins	4
THU				150a/b	152, 153	4 mins	4
FRI	154, 155, 156		164	165		5 mins	5
MON		157, 158, 159a/b		166, 167		6 mins	5
TUE		160, 161, 162, 163		168		5 mins	5
WED				169, 170, 171	175	4 mins	5
THU				172, 173, 174	176	4 mins	5
FRI	177	178, 179, 180				4 mins	6
MON				181(a or b), 182	185, 186, 187	5 mins	6
TUE				183, 184		2 mins	6
WED	188, 189	190, 191		200	204	6 mins	7
THU		192, 193, 194		201, 202, 203		6 mins	7
FRI		195, 196, 197, 198	199		205	6 mins	7
MON	206	208, 209				3 mins	8/9
TUE	207a/b	210, 211				4 mins	8/9
WED		212, 213		217		3 mins	8/9
THU		214, 215		218		3 mins	8/9
FRI		216		219		2 mins	8/9

Foundation Specification

	Number	Algebra	Ratio & Proportion	Geometry & Measures	Probability & Stats	Total time of clips	Grade
MON	1, 2, 3, 4, 5, 6	7, 8				8 mins	1
TUE				9, 10, 11, 12, 13	14, 15, 16	8 mins	1
WED	17, 18, 19, 20	33, 34, 35	38, 39			9 mins	2
THU	21, 22, 23	36, 37	40, 41, 42			8 mins	2
FRI	24, 25, 26			43, 44, 45, 46, 47	57, 58	10 mins	2
MON	27, 28, 29			48, 49, 50	59, 60	8 mins	2
TUE	30, 31, 32			51, 52	61, 62, 63	8 mins	2
WED				53, 54, 55, 56	64, 65	6 mins	2
THU	66, 67, 68, 69	93, 94, 95	105	112		9 mins	3
FRI	70, 71, 72, 73, 74	96, 97	106			8 mins	3
MON	75, 76, 77	98, 99	107	113		7 mins	3
TUE	78, 79, 80	100, 101		114a/b, 115		8 mins	3
WED	81, 82, 83	102, 103, 104		125, 126		8 mins	3
THU	84, 85			116, 117, 118	127a/b	7 mins	3
FRI	86, 87, 88, 89		108, 109, 110			7 mins	3
MON	90, 91, 92		111	119	128, 129	7 mins	3
TUE				120, 121, 122, 123, 124	130a/b	7 mins	3
WED	131, 132	133		145, 146a/b, 147		7 mins	4
THU		134a/b, 135(a or b)	142, 143	148		6 mins	4
FRI		136, 137	144	149		4 mins	4
MON		138, 139, 140, 141			151	5 mins	4
TUE				150a/b	152, 153	4 mins	4
WED	154		164			2 mins	5
THU	155	157, 158				3 mins	5
FRI	156	159a/b		165		4 mins	5
MON		160, 161		166		3 mins	5
TUE		162		167		2 mins	5
WED		163		168		2 mins	5
THU				169, 170, 171	175	4 mins	5
FRI				172, 173, 174	176	4 mins	5

Useful Revision Websites: MathsWatch

Open https://vle.mathswatch.co.uk/vle/

1. **To log in, type:**

   Your username

   Your password

2. **To start, click first on Videos:**

3. Then, on Find a Clip, choose:

Qualification: GCSE

Tier: Higher or Foundation (whichever course you are doing)

Grade: the appropriate grade you are revising

Topic: the topic you'd like to revise

4. **Click on the video you'd like to watch**
   During the clip, you'll be asked to solve some questions, with answers being provided so you can check how you are doing. For every clip, there are also worksheets attached with some questions for you to solve.

Alternatively, …

…if you want to "explore" topics you do not feel very confident with, click on Search, then type a keyword for the maths topic you would like help with. **Good revision.**

Another useful Revision website:

Your PiXL Maths App

PiXLmaths
partners in excellence Copyright © 2009-2017 The PiXL Club. Version 2.16.

| Usage data | Class lists | Class analysis | Logout |

Design a test   Skills overview   Gap analysis   Take a challenge   Arithmetic   Score board   Homework tasks

Feature Explained   Search   Number   Algebra   Ratio & Proportion   Geometry   Probability   Statistics   Problem Solving

② ③ Number operations - 1 out of 14
Operating with integers and decimals.
Knowledge of number complements.

④ Rounding and related calculations - 1 out of 5
Calculating related calculations and applying BIDMAS.
Rounding to a specific degree of accuracy.

④ ⑥ Factors, multiples and primes - 5 out of 5
Identify a factor or a multiple.
Reduce a number to a product of primes and find HCF/LCM.

④ Fractions, decimals and percentages - part a - 7 out of 7
Simplify a fraction. Convert between fractions, decimals and percentages. Write one number as a % of another.

④ Fractions, decimals and percentages - part b - 8 out of 8
Order fractions. Convert between improper and mixed number fractions. Operate with fractions.

④ ⑤ ⑦ Fractions, decimals and percentages - part c - 7 out of 8
Recurring decimals into fractions. Find a fraction/% of a number. Increase/decrease by a %. Calculate a reverse %.

⑤ ⑦ Indices - 0 out of 10
Recall simple powers. Apply the first 3 index laws. Evaluate positive, negative and fractional indices.

④ Standard form - 4 out of 7
Convert between ordinary numbers and standard form.
Operate with numbers written in standard index form.

⑧ Surds - 0 out of 7
Simplify a surd. Rationalise a denominator.
Operate with surds.

⑦ Upper and lower bounds - 0 out of 12
Identify the upper and lower bounds of integers values.
Calculate using upper and lower bounds.

Coloured   Begin Test   vel/grade

Ask your teacher for:

- **Your login details**

  and

- **PiXL Maths App Challenge**

More Useful Revision Websites

Maths Watch VLE *(tutorial available)*

https://vle.mathswatch.co.uk/vle/

MyMaths

https://www.mymaths.co.uk

⇨ *Ask your teacher for passwords*

Other useful revision sources online

Free access

- www.corbettmaths.com
    - *tutorial videos, practice questions, 5-a--day questions, revision booklets).*

- https://www.mrcartermaths.com

- https://www.drfrostmaths.com

- www.everythingmaths.co.uk
    - *topics by grade*

- http://www.mrbartonmaths.com/pupils.htm
    - *lots of great links, revision materials, past papers and worked answers*

- http://www.hegartymaths.com
    - *revision videos*
- http://www.examsolutions.net/

- http://www.mathsgenie.co.uk/papers.html

- https://www.youtube.com/channel/UCBuMwlP7kHkNxdPAqtFSJTw

REVISING MATHS

Practising

- Use or make revision cards, a popplet or a Prezi
- Google it!
- Work through past papers
- BUT do get them marked using a mark scheme
- Ask for help if unsure
- Study with a friend – teach them a topic & vice versa
- Follow @ReviseJustMaths
- Do a little bit of "practice" every day
- Make sure you have and USE a recommended revision guide
- Find a quiet workspace
- Know the formula you need to remember & what is in the paper
- Know what topics to focus on
- Make a list and update it regularly
- Take regular breaks
- Make a timetable
- Work through past papers
- Watch the tutorials or revision clips your teacher suggests

Its no good just owning a guide … USE IT!

To revise maths you need to DO maths!

The language of your Maths exam!

Simplify
Collect like terms together

Simplify e + 7e
Answer: 8e

You must show your working
If you don't show your working you won't get ALL the marks!

Factorise
To find factors (put brackets in)

Factorise 6x + 10x²
Answer: 2x(3 + 5x)

Diagram NOT accurately drawn
Don't measure angles or sides.

Work out
A written or mental calculation is needed.

Work out 6²
Answer: 6 x 6 = 36

Explain
You must state why!

Solve
Find the value of, usually find what 'x' is!

Solve: 3x = 12
Answer: x = 4

Measure
Use a ruler or protractor to accurately measure lines or angles.

Estimate
Don't work out exactly! Round the numbers, then tell the answer.

Estimate 4.7 x 6.2
Answer: 5 x 6 = 30

Calculate
You will need to do a sum either with or without your calculator.

Give your answer in its simplest form
Cancelling of a fraction or ratio is needed.

12 : 15
simplified is 4 : 5

Expand
Multiply out (remove brackets)

Expand 4 (3x – 2)
Answer: 12x – 8

Describe fully
Usually transformations:

Translation by a vector (2 marks)
Enlargement of a scale factor about a point (3 marks)
Reflection in a mirror line (2 marks)
Rotation through an angle about a point (3 marks)

Construct, using ruler and compasses
Your ruler is a straight edge and compasses must be used to draw arcs.

Sketch
An accurate drawing is not needed: freehand will do!