

Revision Checklist for IGCSE Mathematics 0580

A guide for Students



UNIVERSITY *of* CAMBRIDGE
International Examinations

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A guide for students

How to use this guide

This guide describes what you need to know about your IGCSE Mathematics examination.

It will help you plan your revision programme for the written examinations and it will explain what the examiners are looking for in the answers that you write. It can also be used to help you revise by using the tick boxes in Section 3, 'What you need to know', to check what you know and which topic areas you have covered.

The guide contains the following sections:

Section 1: How will you be tested?

This section will give you information about the different types of examination Papers that are available.

Section 2: What will be tested?

This section describes the areas of knowledge, understanding and skills that the Examiners will test you on.

Section 3: What you need to know

This shows the syllabus content in a simple way so that you can check:

- what you need to know about each topic
- how the Extended syllabus (Supplement) differs from the Core syllabus
- how much of the syllabus you have covered

Section 4: Examination Information

This section gives you some details about what you need to do in the exam.

Not all the information will be relevant to you. You will need to select what you need to know in Sections 1 and 3 by finding out from your teacher which examination Papers you are taking.

Section 1: How will you be tested?

1.1 The examination Papers you will take

You will take **two** papers, **either** Paper 1 and Paper 3, **or** Paper 2 and Paper 4.

If your teacher thinks that you should enter for the examination based on the Core syllabus, you will take Paper 1 and Paper 3.

If your teacher thinks that you should enter for the examination based on the Extended syllabus, you will take Paper 2, and Paper 4.

Whether you follow the Core syllabus, or the Extended syllabus will depend on the progress your teacher thinks you have made and which Papers best suit your particular strengths. You should discuss this with your teacher.

1.2 About the papers

This table gives you information on the papers. It is important to answer all the questions during the examination and to show your workings in the space provided.

<i>Paper number</i>	<i>How long?</i>	<i>What's in the paper?</i>	<i>What's the % of the total examination</i>
Paper 1 (Core)	1 hour	Short-answer questions Answers should be written in the spaces provided	35%
Paper 2 (Extended)	1 ½ hours	Short-answer questions Answers should be written in the spaces provided	35%
Paper 3 (Core)	2 hours	Structured questions Answers should be written in the spaces provided	65%
Paper 4 (Extended)	2 ½ hours	Structured questions Answers should be written on lined paper, or graph paper if the question demands it.	65%

You must answer all questions, and workings should be written in the spaces provided on each Paper.

Section 2: What will be tested?

The full syllabus, which your teacher will have, lists the assessment objectives in detail. However, you should note that you must be able to:

- Use tables, graphs and diagrams
- Write answers in symbols, numbers and words
- Use an electronic calculator
- Use compasses, a protractor and a ruler accurately
- Express answers to an appropriate degree of accuracy.

You should ask your teacher if you require more detailed information on this section.

Section 3: What you need to know

This is a table, which describes the things you may be tested on in the exam. It is arranged in 37 topic areas. If you are studying only the Core syllabus (Papers 1 and 3), you will need only refer to column headed Core material. If you are studying the Extended syllabus (Papers 2 and 4), you will need to refer to both the Core and Extended material columns. If you are unsure about which material to use, you should ask your teacher for advice.

How to use the table

You can use the table throughout your Maths course to check the topic areas you have covered. You can also use it as a revision aid. When you think you have a good knowledge of a topic, you can tick the appropriate box in the checklist column. The main headings in the column headed Topics are usually followed by the details of what you should know. Test yourself as follows:

- cover up the details with a piece of paper
- try to remember the details
- when you have remembered the details correctly, put a tick in the appropriate box

If you use a pencil to tick the boxes you can retest yourself whenever you want by simply rubbing out the ticks. If you are using the table as checklist of which topics you have covered, you can put a tick in the topic column next to the appropriate bullet point.

The column headed comments can be used:

- to add further information about the details for each bullet point
- to note relevant page numbers from your text book
- to add learning aids
- to highlight areas of difficulty/things which you need to ask your teacher about

What you need to know

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
1 Number, set notation and language	Identify and Use : <ul style="list-style-type: none"> • natural numbers • integers (positive, negative and zero) • prime numbers • common factors and common multiples • rational and irrational numbers • real numbers Continue a given number sequence Recognise patterns in sequences and relationships between different sequences Generalise to simple algebraic statements (including expressions for the n th term) relating to such sequences	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use language, notation and Venn diagrams to describe sets and represent relationships between sets as follows: Definition of sets, e.g. $A = \{x: x \text{ is a natural number}\}$ $B = \{(x,y): y = mx + c\}$ $C = \{x: a \leq x \leq b\}$ $D = \{a, b, c, \dots\}$ Notation Number of elements in set A $n(A)$ "...is an element of ..." \in "...is not an element of ..." \notin Complement of a set A' The empty set \emptyset Universal set \mathcal{E} A is a subset of B $A \subseteq B$ A is a proper subset of B $A \subset B$ A is not a subset of B $A \not\subseteq B$ A is a proper subset of B $A \subset B$ Union of A and B $A \cup B$ Intersection of A and B $A \cap B$	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
2 Squares Square roots Cubes	Calculate: <ul style="list-style-type: none"> • squares of numbers • square roots of numbers • cubes of numbers 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
3 Directed Numbers	Use directed numbers in practical situations	<input type="checkbox"/>			
4 Vulgar and decimal fractions and percentages	Use the language and notation of simple vulgar and decimal fractions and percentages in appropriate contexts; recognise equivalence and convert between these forms	<input type="checkbox"/> <input type="checkbox"/>			
5 Ordering	Order quantities by magnitude and demonstrate familiarity with the symbols =, ≠, >, <, ≥, ≤	<input type="checkbox"/>			
6 Standard form	Use the standard form $A \times 10^n$ where n is an integer and $1 \leq A < 10$	<input type="checkbox"/>			

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
7 Four Rules	Use the four rules for calculations with: <ul style="list-style-type: none"> • whole numbers • decimal fractions • vulgar and mixed fractions • correct ordering of operations and use of brackets 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
8 Estimation	Make estimates of : <ul style="list-style-type: none"> • numbers, quantities and lengths Give approximations to a specified number of: <ul style="list-style-type: none"> • significant figures • decimal places Round off answers to reasonable accuracy in the context of a given problem	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
9 Limits of accuracy	Give upper and lower bounds for data given to a specified accuracy	<input type="checkbox"/>	Obtain appropriate upper and lower bounds to solutions of simple problems	<input type="checkbox"/>	
10 Ratio Proportion Rate	Understand ratio, direct and inverse proportion and rate Use scales in practical situations Divide quantities in a given ratio Calculate average speed	<input type="checkbox"/> <input type="checkbox"/>	Express direct and inverse variation in algebraic terms and use this to find unknown quantities Increase and decrease a quantity by a given ratio	<input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
11 Percentages	Calculate a % of a quantity Express one quantity as a % of another quantity Calculate % increase or decrease	<input type="checkbox"/> <input type="checkbox"/>	Calculate reverse percentages, e.g. finding the cost price given the selling price and the percentage profit	<input type="checkbox"/>	
12 Calculator	Use a calculator efficiently Check accuracy of calculations	<input type="checkbox"/>			
13 Measures	Use current units of <ul style="list-style-type: none"> • mass • length • area • volume and capacity Express quantities in terms of smaller or larger units	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
14 Time	Calculate times in terms of the 24-hour and 12-hour clock Read <ul style="list-style-type: none"> • clocks • dials • timetables 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
15 Money	Calculate using money Convert form one currency to another	<input type="checkbox"/>			

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
16 Personal and Household Finance	Use given data to solve problems on <ul style="list-style-type: none"> • earnings • simple interest • discount • profit and loss Extract data from tables and charts	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
17 Practical Graphs	Demonstrate familiarity with cartesian coordinates in two dimensions Interpret and use graphs in practical situations including <ul style="list-style-type: none"> • travel graphs • conversion graphs Draw graphs from given data	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Apply the idea of rate of change to: <ul style="list-style-type: none"> • distance-time graphs • speed-time graphs • acceleration and deceleration Calculate distance travelled as an area under a linear speed-time graph	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
18 Graphs of functions	Construct tables of values for functions of the form <ul style="list-style-type: none"> • $ax + b$ • $\pm x^2 + ax + b$ • $a/x \quad x \neq 0$ where a and b are integral constants Draw and interpret such graphs Find the gradient of a straight line graph Solve linear and quadratic equations approximately by graphical methods	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Construct tables of values and draw graphs for functions of the form <ul style="list-style-type: none"> • ax^n where a is a rational constant and $n = -2, -1, 0, 1, 2, 3$ and simple sums of not more than three of these • a^x where a is a positive integer Estimate gradients of curves by drawing tangents Solve associated equations approximately by graphical methods	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
19 Straight line Graphs			Calculate the gradient of a straight line from the co-ordinates of two points on it Calculate the length and of a straight line segment from the co-ordinates of its end points Interpret and obtain the equation of a straight line graph in the form $y=mx+c$	<input type="checkbox"/> <input type="checkbox"/>	
20 Basic Algebra	Use letters to express generalised numbers Express basic arithmetic processes algebraically Substitute numbers in formulae Transform simple formulae	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Construct equations from situations Transform more complicated formulae	<input type="checkbox"/>	
21 Algebraic Manipulation	Manipulate directed numbers Use brackets Extract common factors	<input type="checkbox"/> <input type="checkbox"/>	Expand products of algebraic expressions Factorise expressions of the form $ax + ay$, $ax + bx + kay + kby$, $a^2x^2 - b^2y^2$, $a^2 + 2ab + b^2$, $ax^2 + bx + c$ Manipulate algebraic fractions Factorise and simplify algebraic fractions such as $\frac{x^2 - 2x}{x^2 - 5x + 6}$	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
22 Functions			Use function notation to describe simple functions and the notation $f^{-1}(x)$ to describe their inverses Work out composite functions as defined by $gf(x) = g(f(x))$	<input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
23 Indices	Use and interpret <ul style="list-style-type: none"> • positive indices • negative indices • zero indices 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use and interpret fractional indices	<input type="checkbox"/>	
24 Equations Inequalities	Solve simple linear equations in one unknown Solve simultaneous linear equations in two unknowns	<input type="checkbox"/> <input type="checkbox"/>	Solve quadratic equations by <ul style="list-style-type: none"> • factorisation • formulae • completing the square Solve simple linear inequalities	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
25 Linear Programming			Represent inequalities graphically Solve simple linear programming problems(the conventions of using broken lines for strict inequalities and shading unwanted regions will be expected)	<input type="checkbox"/> <input type="checkbox"/>	
26 Geometry	Use and interpret -the terms: <ul style="list-style-type: none"> • point, line, parallel, bearing • acute, obtuse, reflex angle • right angle, perpendicular • similarity, congruence -the vocabulary <ul style="list-style-type: none"> • triangles, quadrilaterals • circles, polygons • simple solid figures & nets 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use relationships between <ul style="list-style-type: none"> • Areas of similar triangles • Areas of similar figures • Surface area of similar solids • Volumes of similar solids 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
27 Geometrical Constructions	Measure lines and angles Construct a triangle given 3 sides using ruler and compasses only Construct other simple geometrical figures from given data using protractor and set square Construct using straight edge and compasses only <ul style="list-style-type: none"> • angle bisectors • perpendicular bisectors Read and make scale drawings	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
28 Symmetry	Recognise and describe <ul style="list-style-type: none"> • rotational and line symmetry in 2 dimensions • symmetry properties of triangles, quadrilaterals and circles 	<input type="checkbox"/> <input type="checkbox"/>	Recognise and use symmetry of <ul style="list-style-type: none"> • prism, cylinder, cone and pyramid Use the following symmetry properties of circles <ul style="list-style-type: none"> • equal chords are equidistant from the centre • perpendicular bisector of a chord passes through the centre • tangents from an external point are equal in length 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
29 Angle Properties	Calculate unknown angles using the geometrical properties of angles <ul style="list-style-type: none"> • at a point • within parallel lines • in triangles • in quadrilaterals • in regular polygons • in a semi-circle • between tangent and radius of a circle 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Calculate unknown angles using the following geometrical properties : <ul style="list-style-type: none"> • angles properties of irregular polygons • angle at the centre of a circle is twice the angle at the circumference • angles in the same segment are equal • angles in opposite segments are supplementary 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
30 Locus	Use the following loci and the methods of intersecting loci for sets of points in two dimensions which are : <ul style="list-style-type: none"> • a given distance from a point • a given distance from a straight line • equidistant from two points • equidistant from two intersecting lines 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
31 Mensuration	Carry out calculations involving: <ul style="list-style-type: none"> • perimeter and area of a triangle • perimeter and area of a rectangle • circumference and area of a circle • area of parallelogram • area of a trapezium • volume of a cuboid, prism and cylinder • surface area of a cuboid and cylinder 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Solve problems involving: <ul style="list-style-type: none"> • arc length and sector area of a circle • surface area and volume of a sphere • surface area and volume of a pyramid • surface area and volume of a cone 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
32 Trigonometry	Use and interpret three figure bearings measured clockwise from the north Find unknown sides and/or angles by applying <ul style="list-style-type: none"> • Pythagoras's theorem • sine, cosine and tangent ratios for acute angles in right angled triangles 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Solve problems involving angle of elevation and depression Extend sine and cosine functions to angles up to 360° Solve problems using sine and cosine rules Find the area of any triangle using $\frac{1}{2} ab \sin C$ Solve simple problems in three dimensions including angle between line and plane	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
35 Vectors (two dimensions)	Describe a translation using a vector represented by: <ul style="list-style-type: none"> $\begin{bmatrix} x \\ y \end{bmatrix}$ AB A Add vectors Multiply a vector by a scalar	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Calculate the magnitude of a vector Represent vectors by directed line segments Use the sum and difference of two vectors Use position vectors	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
36 Matrices			Display information in a matrix of any order Calculate the sum and product (where possible) of two matrices Multiply a matrix by a scalar For 2 x 2 matrices use the : <ul style="list-style-type: none"> zero matrix identity matrix and calculate the <ul style="list-style-type: none"> determinant of a matrix inverse of a non-singular matrix 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
37 Transformations	Reflect simple plane figures in horizontal or vertical lines Rotate simple plane figures, through multiples of 90° , about <ul style="list-style-type: none"> • the origin • their vertices • midpoints of their sides Construct translations of simple plane figures Construct enlargements of simple plane figures Recognise and describe <ul style="list-style-type: none"> • Reflections • Rotations • Translations • Enlargements 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use the following transformations of the plane <ul style="list-style-type: none"> • Reflection (M) • Rotation (R) • Translation (T) • Enlargement (E) • Shear (H) • Stretch (S) • combinations of the above transformations where $MR(a)$ means apply R and then M to a Describe transformations using <ul style="list-style-type: none"> • co-ordinates • matrices 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Please note that this does not replace the official syllabus or show any order of study

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
2 Squares Square roots Cubes	Calculate: <ul style="list-style-type: none"> • squares of numbers • square roots of numbers • cubes of numbers • cube roots 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
3 Directed Numbers	Use directed numbers in practical situations	<input type="checkbox"/>			
4 Vulgar and decimal fractions and percentages	Use the language and notation of simple vulgar and decimal fractions and percentages in appropriate contexts; recognise equivalence and convert between these forms	<input type="checkbox"/> <input type="checkbox"/>			
5 Ordering	Order quantities by magnitude and demonstrate familiarity with the symbols =, ≠, >, <, ≥, ≤	<input type="checkbox"/> <input type="checkbox"/>			

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
6 Standard form	Use the standard form $A \times 10^n$ where n is an integer and $1 \leq A < 10$	<input type="checkbox"/>			
7 Four Rules	Use the four rules for calculations with: <ul style="list-style-type: none"> • whole numbers • decimal fractions • vulgar and mixed fractions • correct ordering of operations and use of brackets 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
8 Estimation	Make estimates of : <ul style="list-style-type: none"> • numbers, quantities and lengths Give approximations to a specified number of: <ul style="list-style-type: none"> • significant figures • decimal places Round off answers to reasonable accuracy in the context of a given problem	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
9 Limits of accuracy	Give upper and lower bounds for data given to a specified accuracy	<input type="checkbox"/>	Obtain appropriate upper and lower bounds to solutions of simple problems	<input type="checkbox"/>	
10 Ratio Proportion Rate	Understand ratio, direct and inverse proportion and rate Use scales in practical situations Divide quantities in a given ratio Calculate average speed	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Express direct and inverse variation in algebraic terms and use this to find unknown quantities Increase and decrease a quantity by a given ratio	<input type="checkbox"/> <input type="checkbox"/>	
11 Percentages	Calculate a % of a quantity Express one quantity as a % of another quantity Calculate % increase or decrease	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Calculate reverse percentages, e.g. finding the cost price given the selling price and the percentage profit	<input type="checkbox"/>	
12 Calculator	Use a calculator efficiently Check accuracy of calculations	<input type="checkbox"/> <input type="checkbox"/>			

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
13 Measures	Use current units of <ul style="list-style-type: none"> • mass • length • area • volume and capacity Express quantities in terms of smaller or larger units	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
14 Time	Calculate times in terms of the 24-hour and 12-hour clock Read <ul style="list-style-type: none"> • clocks • dials • timetables 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
15 Money	Calculate using money Convert form one currency to another	<input type="checkbox"/> <input type="checkbox"/>			

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
16 Personal and Household Finance	Use given data to solve problems on <ul style="list-style-type: none"> • earnings • simple interest • compound interest • discount • profit and loss Extract data from tables and charts	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
17 Practical Graphs	Demonstrate familiarity with cartesian coordinates in two dimensions Interpret and use graphs in practical situations including <ul style="list-style-type: none"> • travel graphs • conversion graphs Draw graphs from given data	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Apply the idea of rate of change to: <ul style="list-style-type: none"> • distance-time graphs • speed-time graphs • acceleration and deceleration Calculate distance travelled as an area under a linear speed-time graph	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
18 Graphs of functions	Construct tables of values for functions of the form <ul style="list-style-type: none"> • $ax + b$ • $\pm x^2 + ax + b$ • $a/x \quad x \neq 0$ where a and b are integral constants Draw and interpret such graphs Find the gradient of a straight line graph Solve linear and quadratic equations approximately by graphical methods	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Construct tables of values and draw graphs for functions of the form <ul style="list-style-type: none"> • ax^n where a is a rational constant and $n = -2, -1, 0, 1, 2, 3$ and simple sums of not more than three of these • a^x where a is a positive integer Estimate gradients of curves by drawing tangents Solve associated equations approximately by graphical methods	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
19 Straight line Graphs	Interpret and obtain the equation of a straight line graph in the form $y=mx+c$ Determine the equation of a straight line parallel to a given line	<input type="checkbox"/> <input type="checkbox"/>	Calculate the gradient of a straight line from the co-ordinates of two points on it Calculate the length and the co-ordinates of a straight line segment from the co-ordinates of its end points Construct and transform more complicated formulae and equations	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
20 Basic Algebra	Use letters to express generalised numbers Express basic arithmetic processes algebraically Substitute numbers in formulae Transform simple formulae Construct simple expressions and set up simple equations	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Construct and transform more complicated formulae and equations	<input type="checkbox"/>	
21 Algebraic Manipulation	Manipulate directed numbers Use brackets Extract common factors	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Expand products of algebraic expressions Factorise expressions of the form $ax + bx + kay + kby$, $a^2x^2 - b^2y^2$, $a^2 + 2ab + b^2$, $ax^2 + bx + c$ Manipulate algebraic fractions Factorise and simplify algebraic fractions such as $\frac{x^2 - 2x}{x^2 - 5x + 6}$	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
22 Functions			Use function notation to describe simple functions and the notation $f^{-1}(x)$ to describe their inverses Work out composite functions as defined by $gf(x) = g(f(x))$	<input type="checkbox"/> <input type="checkbox"/>	
23 Indices	Use and interpret <ul style="list-style-type: none"> • positive indices • negative indices • zero indices 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use and interpret fractional indices e.g solve 32^{x+2}	<input type="checkbox"/>	
24 Equations Inequalities	Solve simple linear equations in one unknown Solve simultaneous linear equations in two unknowns	<input type="checkbox"/> <input type="checkbox"/>	Solve quadratic equations by <ul style="list-style-type: none"> • factorisation • formulae • completing the square Solve simple linear inequalities	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
25 Linear Programming			Represent inequalities graphically Solve simple linear programming problems(the conventions of using broken lines for strict inequalities and shading unwanted regions will be expected)	<input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material <i>You should be able to:</i>	Check	Extended material <i>You should be able to:</i>	Check	Comments
26 Geometry	Use and interpret -the terms: <ul style="list-style-type: none"> • point, line, parallel, bearing • acute, obtuse, reflex angle • right angle, perpendicular • similarity, congruence -the vocabulary <ul style="list-style-type: none"> • triangles, quadrilaterals • circles, polygons • simple solid figures & nets 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Use relationships between <ul style="list-style-type: none"> • Areas of similar triangles • Areas of similar figures • Surface area of similar solids • Volumes of similar solids 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
27 Geometrical Constructions	Measure lines and angles Construct a triangle given 3 sides using ruler and compasses only Construct other simple geometrical figures from given data using protractor and set square Construct using straight edge and compasses only <ul style="list-style-type: none"> • angle bisectors • perpendicular bisectors Read and make scale drawings	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
28 Symmetry	Recognise and describe <ul style="list-style-type: none"> • rotational and line symmetry in 2 dimensions • symmetry properties of triangles, quadrilaterals and circles 	<input type="checkbox"/> <input type="checkbox"/>	Recognise and use symmetry of <ul style="list-style-type: none"> • prism, cylinder, cone and pyramid Use the following symmetry properties of circles <ul style="list-style-type: none"> • equal chords are equidistant from the centre • perpendicular bisector of a chord passes through the centre • tangents from an external point are equal in length 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
29 Angle Properties	Calculate unknown angles using the geometrical properties of angles <ul style="list-style-type: none"> • at a point • on a straight line and intersecting straight lines • within parallel lines • in triangles • in quadrilaterals • in regular polygons • in a semi-circle • between tangent and radius of a circle 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Calculate unknown angles using the following geometrical properties : <ul style="list-style-type: none"> • angles properties of irregular polygons • angle at the centre of a circle is twice the angle at the circumference • angles in the same segment are equal • angles in opposite segments are supplementary • in cyclic quadrilaterals 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
30 Locus	Use the following loci and the methods of intersecting loci for sets of points in two dimensions which are : <ul style="list-style-type: none"> • a given distance from a point • a given distance from a straight line • equidistant from two points • equidistant from two intersecting lines 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
31 Mensuration	Carry out calculations involving: <ul style="list-style-type: none"> • perimeter and area of a triangle • perimeter and area of a rectangle • circumference and area of a circle • area of parallelogram • area of a trapezium • volume of a cuboid, prism and cylinder • surface area of a cuboid and cylinder 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Solve problems involving: <ul style="list-style-type: none"> • arc length and sector area of a circle • surface area and volume of a sphere • surface area and volume of a pyramid • surface area and volume of a cone 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
32 Trigonometry	Use and interpret three figure bearings measured clockwise from the north Find unknown sides and/or angles by applying <ul style="list-style-type: none"> • Pythagoras's theorem • sine, cosine and tangent ratios for acute angles in right angled triangles 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Solve problems involving angle of elevation and depression Extend sine and cosine functions to angles between 90° and 180° Solve problems using sine and cosine rules Find the area of any triangle using $\frac{1}{2} ab \sin C$ Solve simple problems in three dimensions including angle between line and plane	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
33 Statistics	Collect, classify and tabulate data Read, interpret and draw simple inferences from tables and statistical diagrams Construct and use <ul style="list-style-type: none"> • bar charts • pie charts • pictograms • frequency distributions • histograms with equal intervals • scatter diagrams (with lines of best fit) Understand what is meant by positive, negative and zero correlation Calculate, for individual and discrete data <ul style="list-style-type: none"> • mean • median • mode and distinguish between their use Calculate the range	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Construct and read from a histogram with equal and unequal intervals. Construct and use a cumulative frequency diagrams to estimate <ul style="list-style-type: none"> • the median • percentiles • quartiles • inter-quartile range For grouped and continuous data <ul style="list-style-type: none"> • calculate an estimate of the mean • identify the modal class 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material You should be able to:	Check	Extended material You should be able to:	Check	Comments
34 Probability	<p>Calculate the probability of a single event as a fraction or a decimal (not a ratio)</p> <p>Understand and use the probability scale from 0 to 1</p> <p>Understand that: <u>the probability of an event occurring</u> = 1 - <u>the probability of the event not occurring</u></p> <p>Understand relative frequency</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Calculate the probability of combined events using:</p> <ul style="list-style-type: none"> • possibility diagrams • tree diagrams 	<input type="checkbox"/> <input type="checkbox"/>	
35 Vectors (two dimensions)	<p>Describe a translation using a vector represented by:</p> <p>• $\begin{pmatrix} x \\ y \end{pmatrix}$</p> <ul style="list-style-type: none"> • AB • \mathbf{A} <p>Add and subtract vectors</p> <p>Multiply a vector by a scalar</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>Calculate the magnitude of a vector</p> <p>Represent vectors by directed line segments</p> <p>Use the sum and difference of two vectors</p> <p>Use position vectors</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Topic	Core material <i>You should be able to:</i>	Check	Extended material <i>You should be able to:</i>	Check	Comments
36 Matrices			Display information in a matrix of any order Calculate the sum and product (where possible) of two matrices Multiply a matrix by a scalar For 2 x 2 matrices use the : <ul style="list-style-type: none"> • zero matrix • identity matrix and calculate the <ul style="list-style-type: none"> • determinant of a matrix • inverse of a non-singular matrix 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Section 4: Examination Information

In the examination

- You should take into the examination a calculator and any mathematical instruments that you need.
- You may use an electronic calculator at all times unless a particular question forbids it.
- Answers should be written in blue or black ink (except for graphs and diagrams, which may be done in pencil).
- All working (except in Paper 4) should be written in the answer spaces provided.
- It is essential that you show as much working as possible in all questions on all the papers as marks are awarded for the working in many questions.
- Diagrams and angles should be drawn as accurately as possible.
- Points in graphs should be plotted as accurately as possible.