PEARSON EDEXCEL INTERNATIONAL GCSE (9-1) Mathematics A & B

Welcome to Pearson: Module 1

First teaching in 2017, first assessment in 2019.

Your trainer today is:

Session Objectives

- Welcome to Pearson
- To explore the content of International GCSE mathematics A and B.
- To look at examiner reports and how to use them.
- To look at planning a course of study using the resources on the Pearson website.

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Poll

1. Have you prepared students for Pearson qualifications in the past?
2. On a scale of 1 – 10 how familiar are you with the Pearson International GCSE qualification 4MA1?
3. On a scale of 1 – 10 how familiar are you with the Pearson International GCSE qualification 4MB1?

(1 = not at all familiar and 10 = very familiar)

Welcome to Pearson Edexcel

Welcome to Pearson Edexcel,
the world's leading learning company
and the UK's largest awarding body.

We set the standard for worldwide recognised qualifications, built on the UK educational system and accepted by universities worldwide.

We have a simple mission:
to help make a measurable impact on improving people's lives through learning.

"We judge ourselves – and invite others to judge us – not by the products that we make but by the impact on learners."

John Fallon,
Chief Executive Officer, Pearson

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About Pearson Edexcel

- As the UK's largest awarding organisation, we are best placed to provide qualifications that are most closely aligned to the British educational system.
- We are the most reliable awarding organisation in the UK, recognised and trusted by educators, learners and employers to provide high quality qualifications.
- By helping you to realise student potential, you can prepare and empower all your students to progress to further education, university and employment.
- Our technology capability allows us to provide you with more advanced support services, tools and resources to make life easier for school leaders, teachers and students.
- Pearson Edexcel are leading the way, challenging thinking and creating new ideas so you can be confident our qualifications will always be world-class.

Getting ready for delivery

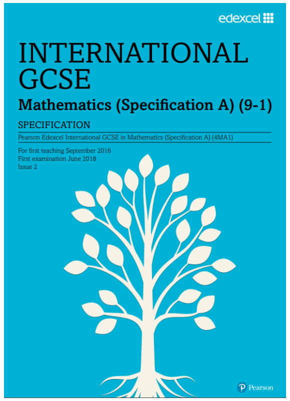
What are specifications and SAMs?

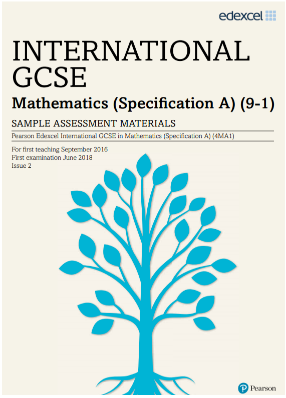
Specification

- A specification is the main document you need to teach the course.
- It outlines the aims of the course, the content you MUST cover and all the information you need about assessing your students.
- A copy of this document is in your pack and on our website.

SAMs

- SAMs is short for Sample Assessment Materials. This document is just as important as the specification.
- The SAMs are examples of the question papers and mark schemes and show the question types and how they will be marked by the examiners.
- We base all of our future papers and assessments on these Sample Assessment Materials.





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Using the specification

Content

1 **4MA1 – Foundation and Higher tier**

This is arranged as six broad topics arranged into sub-topics as appropriate. As a minimum all the content must be taught in each tier.
A column for additional notes is included to clarify the detail of what must be covered.

2 **4MB1 – Available only in higher tier**

This is arranged as ten broad topics arranged into subtopics as appropriate. As above, all the content must be taught . This is arranged into two columns; 'What students need to learn' and 'Notes'. The latter contains clarification of the detail in the specification as well as some examples.

The flow chart of the complete assessment process

The paper and mark scheme are written and go through the various stages of scrutiny and printed in readiness for the examination. This process starts about two years before the examination date.

On the day of the examination, candidates sit the examination. Your examination officer will pack the scripts and post them to Edexcel Pearson in Rotherham

Scripts are scanned in preparation for electronic marking. The Principal Examiner prepares the final mark scheme and issues this to each examiner. This means **every** script is marked in **exactly the same way**.

The scripts are marked electronically. Samples of work are checked by; Team Leaders throughout the process to maintain accuracy of marking, and also by having pre-marked scripts in each examiner allocation to ensure quality of marking.

When all marking is complete, the marks are analysed statistically, and the Awarding Committee comprised of the Chair of Examiners and other senior assessors sets the grade boundaries for each paper. The results are delivered to centres on Results day.

https://qualifications.pearson.com/en/support/support-topics/results-certification/understanding-marks-and-grades.html

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Content overview
4MA1

Overview of the specification 4MA1

Paper 1	Paper 2
• Externally assessed • Availability – January and June 50% of the total International GCSE	• Externally assessed • Availability – January and June 50% of the total International GCSE

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Paper 1F and 2F – Foundation Tier

Assesses **all the content** in Foundation tier specification. Questions may come from any topic area across the specification (including questions that address more than one topic).

1. Numbers and the number system
2. Equations, formulae and identities
3. Sequences, functions and graphs
4. Geometry and trigonometry
5. Vectors and transformation geometry
6. Statistics and probability

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Paper 1H and 2H – Higher Tier

Assesses **all the content** in the Higher tier specification. Questions may come from any topic area across the specification (including questions that address more than one topic).

1. Numbers and the number system
2. Equations, formulae and identities
3. Sequences, functions and graphs
4. Geometry and trigonometry
5. Vectors and transformation geometry
6. Statistics and probability

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Problem solving

Relationship of problem solving and mathematical reasoning skills to tiers.

Paper	Problem Solving	Reasoning, interpretation and reasoning
Foundation (1F and 2F)	25%	15%
Higher (3H and 4H)	30%	20%

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Content overview
4MB1

Overview of the specification 4MB1

Paper 1	Paper 2
• Externally assessed • Availability – January and June 33⅓ % of the total International GCSE	• Externally assessed • Availability – January and June 66⅔ % of the total International GCSE

Paper 1 and Paper 2

Assesses **all the content** in the specification.
Questions may come from any topic area across the specification (including questions that address more than one topic).

1. Number
2. Sets
3. Algebra
4. Functions
5. Matrices
6. Geometry
7. Mensuration
8. Vectors and transformation geometry
9. Trigonometry
10. Statistics and Probability

Problem solving and reasoning

Relationship of problem solving and mathematical reasoning skills to tiers.

Paper	Problem Solving	Reasoning, interpretation and reasoning
Paper 1 and 2	30%	20%

Examiner reports

Examiner reports

The importance of reading examiner reports when the examination results are published cannot be overstated.

They highlight the areas for development that centres need to concentrate on and some topics receive frequent mention in these reports.

The following slides show the main points from the introductory paragraphs as well as examples of detailed reports on questions.

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Examiner reports
4MA1

What our examiners have noticed – Foundation Tier
The following are extracts from the June 2019 Examiner reports (1)

Students who were well prepared for this paper made a good attempt at the majority of the questions. The questions involving multi-stage calculations, for instance question 8 and question 17, were often not completed by students who generally showed a lack of understanding on how to proceed.
On the whole students tended to show their working but for some students the need to show all stages must be stressed to enable them to maximise their mark gaining potential.

Working was frequently shown and easy to follow through. There were some instances where students failed to read the question properly. For example, in question 16(a) students regularly found 40% of ½ of the books while in 16(b) some students worked out the percentage of 15 and did not realise this was a question on reverse percentages.

A striking weakness in students was the method of solving simultaneous equations. On the whole, problem solving questions and those assessing mathematical reasoning were not tackled well; particular question 21.

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What our examiners have noticed – Foundation Tier
The following are extracts from the June 2019 Examiner reports (2)

Students who were well prepared for this paper were able to gain a good measure of success on the majority of questions. A feature of the new specification is problem solving questions. These tend to be more open-ended questions with less direction and prompts given at the outset. They frequently include the phrase 'explain your answer' or ask for some other justification of the answer. Students often lose marks here through either ignoring this aspect of the question or through the brevity of their answers. Q2(d), Q11 and Q14 were good examples of this style of problem solving questions. Many candidates here did necessary calculations but failed to reach a conclusion.

Note these sentences very carefully.

Note the importance of writing a conclusion in problem solving questions.

The following slides show a question and the detailed report on that question.

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June 2109   Paper 1 Question 8

The diagram shows two triangles, *CDB* and *BDA*.

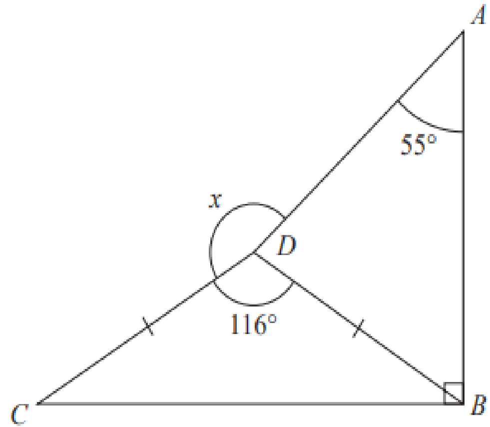

Diagram **NOT** accurately drawn

$DC = DB$
Angle $ABC = 90°$
Angle $CDB = 116°$
Angle $DAB = 55°$

Work out the size of the angle marked x.
Give a reason for each stage of your working.

This is a reasoning question.

Question 8 – Examiner Report

Question 8

There were a high number of responses that showed little understanding of how to proceed in this multi-step question to find the size of an angle on a diagram. Some basic misconceptions appeared regularly, such as assuming that the line *DB* bisected angle *ABC* and angle *ADC*. Working that developed from this was inevitably flawed. Encouragingly there were also many students who competently reached the correct answer for the size of the angle. Of these, a significant number lost one or both of the remaining two marks, as they failed to give any reasons or gave reasons that were not sufficient. For example, "a triangle is 180°" could not gain credit; there needs to be some kind of reference to the *angles* in the triangle adding up to 180°. Likewise, "angles in a circle are 360°" did not receive credit as we needed to see this expressed with reference to the angles at a *point* adding up to 360° – this and the omission of any mention of isosceles were the main reasons for the small number of students being awarded the full five marks. Students should also be aware that showing their working, however detailed, is not the same as giving reasons.

Note the key points raised:

Making erroneous assumptions

Incorrect, incomplete or no reasons given

Showing working instead of mathematical reasons is a frequently recurring theme

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June 2109 Paper 1 Question 8 – A model answer

The diagram shows two triangles, *CDB* and *BDA*.

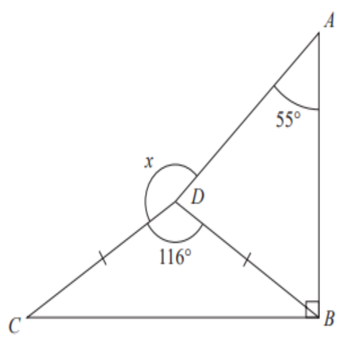

Diagram **NOT** accurately drawn

$DC = DB$
Angle $ABC = 90°$
Angle $CDB = 116°$
Angle $DAB = 55°$

Work out the size of the angle marked x.
Give a reason for each stage of your working.

$$\angle DCB = \angle DBC = \frac{(180^\circ - 116^\circ)}{2} = 32^\circ$$

Base angles in an isoceles triangle

Angles in a triangles add up to 180°

$\angle ABD = 90^\circ - 32^\circ = 58^\circ$ $\quad [\angle ACBA = 90^\circ]$

$\angle BDA = 180^\circ - (58^\circ + 55^\circ) = 67^\circ$

Angles in a triangles add up to 180°

$\angle x = 360^\circ - 67^\circ - 116^\circ = 177^\circ$

Angles around a point add up to 360°

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What our examiners have noticed – Higher Tier
The following are extracts from the June 2019 Examiner reports

Some students are over reliant on their calculators and when asked to show full working are unable to show all the steps involved. They also do not know the full working of their calculator and, for instance, the need to use brackets round a negative number in order to square it, such as for completing the table for the quadratic graph.

There are still some students who do not show their complete method and centres would benefit from spending time with future cohorts practising showing all the steps to their solutions.

Completing the square, probability, vectors, surds and simultaneous equations (one quadratic and one linear) seemed to be a weakness for many students. Operations involving negative numbers were also a weakness.

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Examiner reports
4MB1

What our examiners have noticed - from Paper 1 [Home and Regional]
The following are extracts from the June 2019 Examiner reports

•In general, students should be encouraged to identify the number of marks available for each part of a question and allocate a proportionate amount of time to each part of the question. In addition, students should also be advised to read the demands of the question very carefully before attempting to answer. ~~It should be pointed out that the~~

To enhance performance in future series, centres should focus their students' attention on the following topics:

- Reasons in geometric problems
- Questions that involve the demand to show all working (most notably questions 7, 20 and 21)
- Coordinate geometry
- Histograms
- Unstructured trigonometry questions
- Application of bounds
- Questions requiring algebraic proof

These are all questions that use the command **'show'**

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Comfort break

Activity

What are the implications for teaching and learning arising from the Examiners' reports?

Points to consider:

- How will examiner reports inform your planning in future?
- How will you plan common misconceptions into your lesson?
- Would you consider giving the report to your students after they have completed a past paper?

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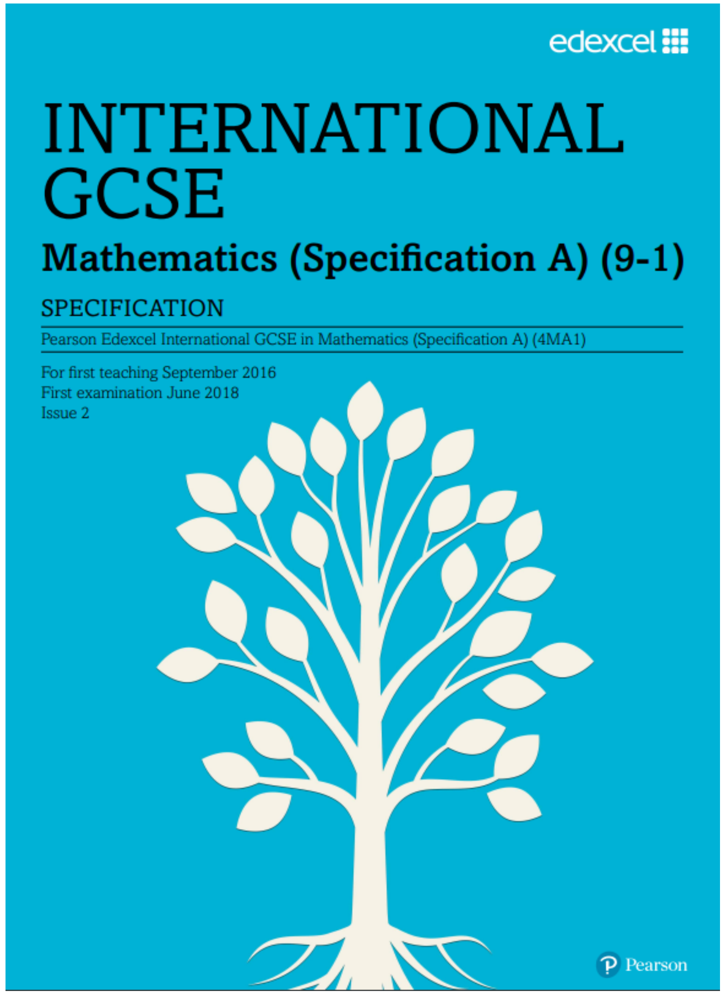
Planning the course and lessons

How do I make sure I cover all the content?

- Specification
- Year planners
- Lesson Plans
- Schemes of Work for both 4MA1 and 4MB1 published in Word so that they can be adapted to your school.

How do I make sure I cover all the content? (1)



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The content page from the specification

Contents

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Qualification aims and objectives

Qualification aims and objectives

The Pearson Edexcel International GCSE in Mathematics (Specification A) qualification enables students to:

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

An example from the specification (4MA1)

This is the content that must be taught.

Examples clarifying the content.

1 Numbers and the number system

	Students should be taught to:	Notes
1.1 Integers	**A** understand and use integers (positive, negative and zero)	
	B understand place value	
	C use directed numbers in practical situations	e.g. temperatures
	D order integers	
	E use the four rules of addition, subtraction, multiplication and division	
	F use brackets and the hierarchy of operations	
	G use the terms 'odd', 'even', 'prime numbers', 'factors' and 'multiples'	
	H identify prime factors, common factors and common multiples	
1.2 Fractions	**A** understand and use equivalent fractions, simplifying a fraction by cancelling common factors	$\frac{8}{60} = \frac{2}{15}$ in its simplest form (lowest terms)
	B understand and use mixed numbers and vulgar fractions	
	C identify common denominators	

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How do I make sure I cover all the content? (2)

Scheme of work

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International GCSE in Mathematics
(Specification A) (4MA1)

Two-year Scheme of Work

For first teaching from September 2016

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How do I make sure I cover all the content? (3)

Year planner

This is the module planner from the Scheme of Work – International GCSE mathematics Specification A

Unit	Title	Specification Reference		Estimated teaching hours
20	Polygons	**4.2A**	recognise and give the names of polygons	5
		4.2D	understand the term 'regular polygon' and calculate interior and exterior angles of regular polygons	
		4.2E	understand and use the angle sum of polygons	
21	Compound measures	**4.4F**	understand and use the relationship between average speed, distance and time	5
		4.4G	use compound measure such as speed, density and pressure	
22	Perimeter, area and volume	**4.9B**	find the perimeter of shapes made from triangles and rectangles	6
		4.9C	find the area of simple shapes using the formulae for the areas of triangles and rectangles	
		4.9D	find the area of parallelograms and trapezia	
		4.10C	find the surface area of simple shapes using the area formulae for triangles and rectangles	
		4.10E	find the volume of prisms, including cuboids and cylinders, using an appropriate formula	
23	Circles and cylinders	**4.6A**	recognise the terms 'centre', 'radius', 'chord', 'diameter', 'circumference', 'tangent', 'arc', 'sector' and 'segment' of a circle	6
		4.6B	understand chord and tangent properties of circles	
		4.9E	find circumferences and areas of circles using relevant formulae; find perimeters and areas of semicircles	
		4.10D	find the surface area of a cylinder	
		4.10E	find the volume of prisms, including cuboids and cylinders, using an appropriate formula	

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An example of a lesson plan from the Scheme of Work

7. Degree of accuracy

Teaching time
3-5 hours

OBJECTIVES

1 J	e.g. identify upper and lower bounds where values are given to a degree of accuracy
	solve problems using upper and lower bounds where values are given to a degree of accuracy

POSSIBLE SUCCESS CRITERIA

Round 16,000 people to the nearest 1000
Round 1100 g to 1 significant figure.
Work out the upper and lower bounds of a formula where all terms are given to 1 decimal place.
Be able to justify that measurements to the nearest whole unit may be inaccurate by up to one half in either direction.

OPPORTUNITIES FOR REASONING/PROBLEM SOLVING

This sub-unit provides many opportunities for students to evaluate their answers and provide counterarguments in mathematical and real-life contexts, in addition to requiring them to understand the implications of rounding their answers.

COMMON MISCONCEPTIONS

Students readily accept the rounding for lower bounds, but take some convincing … upper bounds.

NOTES

Students should use 'half a unit above' and 'half a unit below' to find upper and lower bounds.
Encourage use of a number line when introducing the concept.

EXAMPLE QUESTIONS FROM SAMs: 01 Q 8

Possible success criteria

Problem solving and reasoning are embedded

Common misconceptions

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Activity

Choose one topic (or part of a topic) from the mathematics specification. Plan the order in which you would teach that topic. Don't forget to cover every aspect of the topic from the specification.
Be prepared to share your preferred teaching order, with your reasoning.

Things to consider:
- How do you ensure that you have covered the specification?
- What concerns do you have about planning this course?
- Are there ways you might need to adapt your method(s) of lesson planning to deliver this specification?

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Please fill in your evaluation forms.

We value your feedback!

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ALWAYS LEARNING