



Getting Ready to Teach International GCSE Mathematics

Your Trainer Today is: TRAINERS NAME

Welcome to this Professional Development Training

- Designed for teachers teaching or who are looking to teach the Pearson Edexcel International GCSE Mathematics Specification.
 - 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.
 - To look at how assessment objectives lead to the way examination questions are designed
 - To see how our mark schemes recognise complete and partial achievement
 - To learn how we use our sophisticated data gathering technology to reach a reliable award.
 - Network, discuss best practice and share ideas with other teachers
-

Welcome to Pearson

Welcome to Pearson Edexcel

We are the world's leading learning company and as the **UK's largest awarding organisation**, best placed to provide qualifications aligned to the British

Our international **heritage stretches back over 150 years.**

Today, we partner with schools, universities and employers worldwide, offering world-class, globally-recognized qualifications to over **3.5 million students a year.**



6,500

Trusted and recognized qualifications partner to 6,500 schools, colleges and employers globally.

10 million

We mark over 10 million exam scripts on behalf of the UK Department for Education each year.

70

We operate in 70 countries worldwide.

Our Courses

About our courses

You can be confident that our qualifications will be recognized throughout the world.

The rigour and demand of our international assessments has been found to be comparable with that of our own UK qualifications.

This has been established both internally by a team of Edexcel's own experts.....

...and externally by independent UK consultants

Edexcel International GCSE courses

To satisfy requests from our international centres we offer two courses:

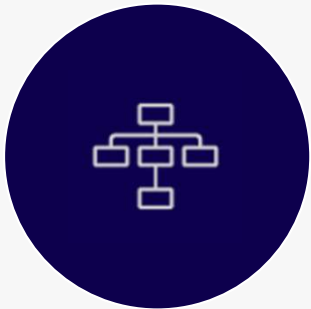
- 4MA1 International GCSE Mathematics Specification A (9 – 1)
- 4MB1 International GCSE Mathematics Specification B (9 – 1) *

**4MA1 is offered as both a full linear course
and now as a modular course consisting of 2
units**

Introducing International GCSE Modular

The two different routes of Assessment

If you're happy with the linear approach, there is no pressure to move to the modular route; our linear International GCSEs will continue to be offered and taken widely by students around the world.



Modular route

Unit assessments can be taken over multiple exam series.

Grades are calculated on raw marks which are then converted to a UMS (Uniform Mark Scale).

Students can re-sit individual units in any exam series.

Once a student has all their unit results, they can 'cash in' these results for their grade.

A modular route is only offered by Pearson Edexcel at International GCSE

Linear route

Assessments for all units are taken together in one exam series.

Grades are calculated on raw marks only.

Students can re-sit assessments for all units together in one exam series.

The grade students receive are calculated at the end of the exam series in which they sat their assessments.



Modular exam structure

The modular and linear approach contact the same content, but the modular approach breaks the journey into two units with an exam at the end of each unit.

Unit 1	Unit 2
Foundation Tier <ul style="list-style-type: none">• Duration: 2 hours• Total number of marks: 100• Weighting: 50%• Grad range: 5-1	Foundation Tier <ul style="list-style-type: none">• Duration: 2 hours• Total number of marks: 100• Weighting: 50%• Grad range: 5-1
Higher Tier <ul style="list-style-type: none">• Duration: 2 hours• Total number of marks: 100• Weighting: 50%• Grad range: 9-4 with an allowable grade 3	Higher Tier <ul style="list-style-type: none">• Duration: 2 hours• Total number of marks: 100• Weighting: 50%• Grad range: 9-4 with an allowable grade 3
For each unit exam, a formulae sheet will be included, and the use of a calculator is permitted.	
Approximately 40% of questions are the same across Foundation and Higher Tier papers.	

Modular content summary

The modular and linear approach contain the same content, but the modular approach breaks the journey into two units with an exam at the end of each unit.

Unit 1	Unit 2
Number (AO1) <ul style="list-style-type: none"> • Basic number skills • Standard form • Limits of accuracy • Surds and indices 	Number (AO1) <ul style="list-style-type: none"> • Ratio and proportion • Percentage skills • Standard form • Repeated percentage change
Algebra (AO1) <ul style="list-style-type: none"> • Basic algebra skills • Set notation • Plotting graphs • Solving basic quadratics $x^2 + bx + c = 0$ • Solving quadratics $ax^2 + bx + c = 0$ • Completing the square • The quadratic formula 	Algebra (AO1) <ul style="list-style-type: none"> • Inequalities • Simultaneous equations • Sequences • Change of subject • Algebraic proof • Direct and inverse proportion • Summation of arithmetic series • Function notation and transformations • Differentiation
Topics in black: studied by both Foundation and Higher Tiers students Topics in red: studied by Higher Tier students only.	

Modular content summary, cntd.

The modular and linear approach contain the same content, but the modular approach breaks the journey into two units with an exam at the end of each unit.

Unit 1	Unit 2
Shape, Space and Measure (AO2) <ul style="list-style-type: none"> • Properties and areas of shapes • Trigonometry • Pythagoras' theorem • Compound measures (speed, density) • Sine and Cosine rule • Sine area of a triangle • 3D Pythagoras' theorem 	Shape, Space and Measure (AO2) <ul style="list-style-type: none"> • Angles in polygons and circles • Symmetry • Constructions • Volume • Similarity • Transformations • Circle theorems • Similar area and volume • Vectors
Handling Data (AO3) <ul style="list-style-type: none"> • Basic probability • Tree diagrams • Conditional probability • Histograms 	Handling Data (AO3) <ul style="list-style-type: none"> • Statistical measure • Cumulative frequency diagrams
Topics in black: studied by both Foundation and Higher Tiers students Topics in red: studied by Higher Tier students only.	

Teaching in a Modular Way

You may want to change the way you teach the International GCSE Mathematics A Specification Content if you take the Modular route for assessment.

- To support your planning and teaching of the course, we are producing **course planners, editable schemes of work** and **Getting Started Guide**.
- First teaching for International GCSE Mathematics A (Modular) is September 2024
- First assessment of International GCSE Mathematics A (Modular) is May/June 2025

Re-sits for Modular International GCSE

- Learners can re-sit any unit irrespective of whether the qualification is to be cashed in.
- If a learner resits a unit more than once, only the better of the two most recent attempts of that unit will be available for aggregation to a qualification grade.
- Results of units will be held in Pearson Edexcel's unit bank for as many years as this specification remains available.
- Once International GCSE in Mathematics A (Modular) has been certificated, all unit results are deemed to be used up at that level. These results cannot be used again towards a further award of the same qualification at the same level.

Specification

Edexcel International GCSE courses

Our assessments consist of the content we test in our examinations.....

..... **The specification**

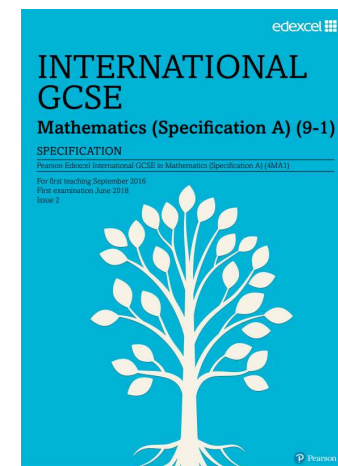
..... and the means by which we test what students who follow our courses can do.....

.....**The examination papers and the associated mark schemes.**

Edexcel International GCSE courses

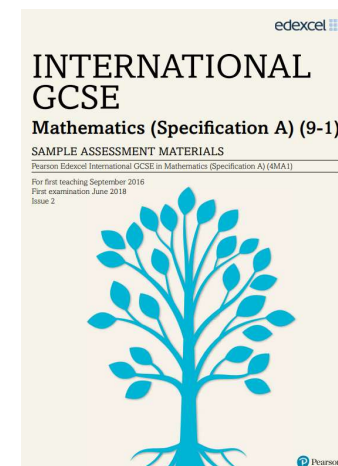
Specification

- 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 online 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.



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.

Foundation tier covers grades 1 to 5

Higher Tier covers grades 4 to 9*

3 Sequences, functions and graphs		
	Students should be taught to:	Notes
3.1 Sequences	A understand and use common difference (d) and first term (a) in an arithmetic sequence	e.g. given 2nd term is 7 and 5th term is 19, find a and d
	B know and use n th term $= a + (n - 1)d$	
	C find the sum of the first n terms of an arithmetic series (S_n)	e.g. given $4 + 7 + 10 + 13 + \dots$ find sum of first 50 terms

Using the specification

Content

2 4MB1 – Available only in Higher tier

This is arranged as ten broad topics arranged into subtopics as appropriate. As in 4MA1, 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.

Higher Tier covers grades 4 to 9*

5 Matrices

What students need to learn	Notes
A Representation of data by a matrix	
B Addition and multiplication of matrices	An understanding of ideas of how to perform row and column multiplication, of order not more than 3×3 , for these operations will be expected
C Multiplication of a matrix by a scalar	
D Unit (identity) matrix and zero (null) matrix	Of order not more than 3×3
E Determinants and inverses of non-singular 2×2 matrices	Knowledge of singular matrices is not required

Assessment

How the content is assessed

Our examinations are constructed by a senior team of experienced examiners'

They consider aspects of assessment such as:

- Content
- Assessment objectives
- Problem solving and mathematical communication
- Mark schemes
- Grading procedures

4MA1

What are assessment objectives?

4MA1

A01 – Demonstrate knowledge of facts, techniques and relationships in:

- Numbers and the number system
- Equations, formulae and identities
- Sequences, functions and graphs

(57 – 63%)

A02 – Demonstrate knowledge of facts, techniques and relationships in:

- Geometry
- Vectors and transformation geometry

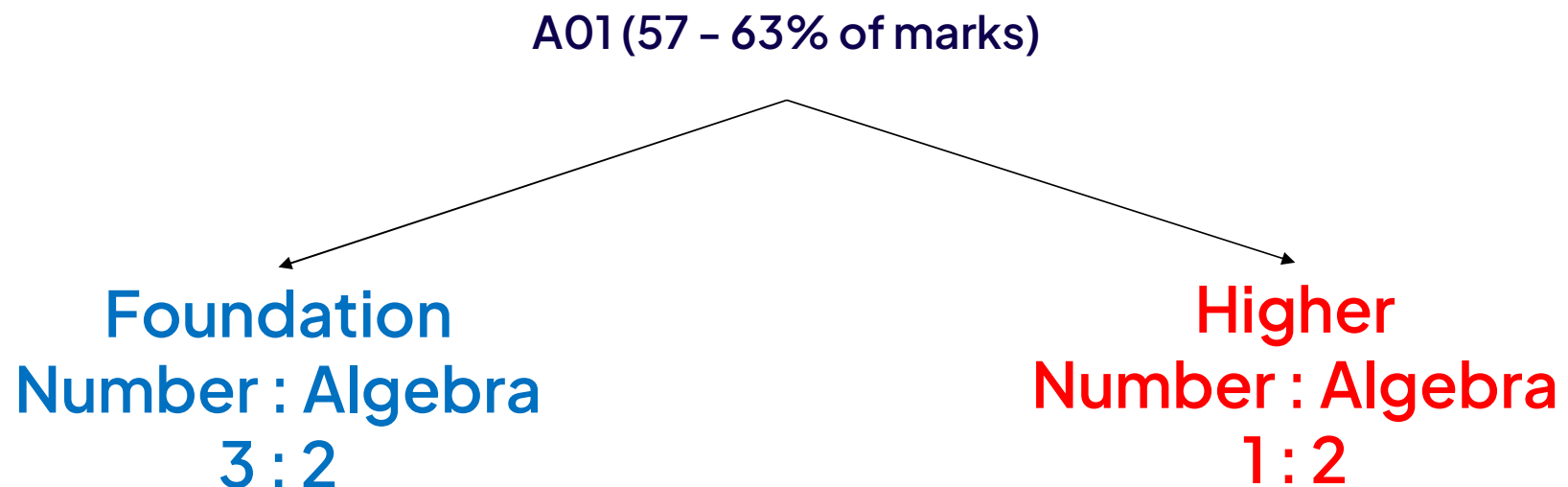
(22 – 28%)

A03 – Demonstrate knowledge of facts, techniques and relationships in:

- Statistics and probability

(12 – 18%)

A01 Split for Foundation and Higher



This split could be a factor in helping to decide whether a student is a Foundation or Higher candidate. The greater emphasis on Algebra is preparation for progression to A level.

Structure of 4MA1 papers 1H and 2H

Content	Assessment
<p>Assesses all the content in the specification.</p> <p>Questions may come from any topic area from the Assessment Objectives across the specification (including questions that address more than one topic).</p>	<p>Each paper:</p> <ul style="list-style-type: none">• Is assessed through a 2-hour examination set and marked by Edexcel.• Is weighted at 50 % of the qualification.• Targets grades 4 – 9• Has around 20 – 25 questions with varying mark allocations which will be stated .• Has a total number of marks of 100.• Allows the use of a calculator is allowed.

Mark allocation of grades 4MA1

Higher Tier

- 40% marks distributed evenly over grades 4 & 5
- 60% of marks distributed evenly over grades 6, 7, 8 & 9

Foundation tier

- All marks distributed evenly over grades 1, 2, 3, 4 & 5

An example of a grade 4/5 question

26 The diagram shows a roof support.

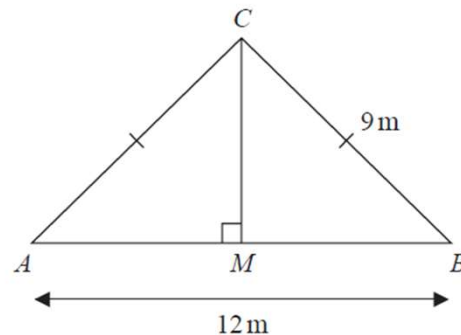


Diagram **NOT**
accurately drawn

This question was on
both F tier and H tier.

The roof support is made from four lengths of wood, AB , AC , BC and MC

$$AC = BC = 9\text{ m} \quad AB = 12\text{ m}$$

$$\text{angle } AMC = 90^\circ$$

Lewis is going to buy lengths of wood to make the roof support.

The wood costs 21.50 euros per metre.

Each length of wood he buys has to be a whole number of metres.

Work out the total cost of the wood Lewis needs to buy.

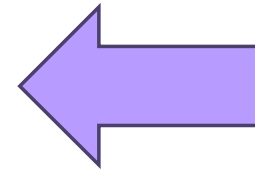
Show your working clearly.

An example of a grade 8 question

22 The straight line **L** has equation $x + y = 5$

The curve **C** has equation $2x^2 + 3y^2 = 210$

Find the coordinates of the points where **L** and **C** intersect.
Show clear algebraic working.



This question was
only on H tier.

Grade Boundaries 4MA1

The minimum marks needed for grade 1 (F Tier only), grade 4 and grade 7 are set using a combination of professional input by the senior examination committee and statistical information.

Roughly speaking papers are set so that students gaining about three-quarters of the marks available on the questions set up to and including that grade will be awarded that grade.

Higher Tier

For grade 7 the number of marks up to and including grade 7 on paper 1 is $20 + 20 + 15 + 15 = 70$

The grade boundary for grade 7 will be roughly 50 – 55 marks.

Foundation tier

For grade 4 the number of marks up to and including grade 4 on paper 1 is $20 + 20 + 20 + 20 = 80$

The grade boundary for grade 4 will be roughly 60 marks.

4MB1

What are assessment objectives?

4MB1

A01 – Demonstrate knowledge of facts, techniques and relationships in:

- Numbers and the number system
- Equations, formulae and identities
- Sequences, functions and graphs

(57 – 63%)

A02 – Demonstrate knowledge of facts, techniques and relationships in:

- Geometry
- Vectors and transformation geometry

(22 – 28%)

A03 – Demonstrate knowledge of facts, techniques and relationships in:

- Statistics and probability

(12 – 18%)

Relationship of assessment objectives to papers

4MB1	Assessment objective		
	A01	A02	A03
Paper 1	28.5–31.5%	11–14%	6–9%
Paper 2	28.5–31.5%	11–14%	6–9%
Total for International GCSE	57–63%	22–28%	12–18%

Structure of 4MB1 paper 1

Content	Assessment
<p>Assesses all the content in the specification.</p> <p>Questions may come from any topic area from the Assessment Objectives across the specification</p> <p>(including questions that address more than one topic).</p>	<p>This paper:</p> <ul style="list-style-type: none">• Is assessed through a 1-hour 30 minute examination set and marked by Edexcel• Is weighted at 33⅓ % of the qualification.• Targets grades 4 – 9• Has about 40% of the paper distributed evenly over grades 4 – 5 and 60 % distributed evenly over grades 6 – 9• Consists of around 26 – 30 questions with varying mark allocations which will be stated .• Has a total number of marks of 100. <p>A calculator is allowed.</p>

Structure of 4MB1 paper 2

Content	Assessment
Assesses all the content in the specification. Questions may come from any topic area from the Assessment Objectives across the specification (including questions that address more than one topic).	This paper: <ul style="list-style-type: none">• Is assessed through a 2-hour 30 minute examination set and marked by Edexcel.• Is weighted at 66⅔ % of the qualification.• Targets grades 4 – 9• Has about 40% of the paper distributed evenly over grades 4 – 5 and 60 % distributed evenly over grades 6 – 9• Consists of around 11 – 12 questions with varying mark allocations which will be stated .• The total number of marks is 100.• A calculator is allowed.

An example of a grade 5/6 question

- 1 (a) Write 0.000 015 96 in standard form.

(1)

The star, Sirius, is approximately 81 460 000 000 000 km from Earth.
Light from Sirius takes approximately 3142.7 days to reach Earth.

- (b) Calculate the speed, in km/s to one significant figure, that light travels from Sirius to Earth.
Give your answer in standard form.
Show your working clearly.

(4)

An example of a grade 7/8 question

h is the function such that

$$h : x \mapsto 2x^2 + 4x - 5 \quad x > -1$$

(e) Express $h(x)$ in the form $a(x + b)^2 - c$ where a , b and c are integers.

(3)

(f) Hence find the inverse function h^{-1} in the form $h^{-1} : x \mapsto \dots$

(2)

What types of questions are asked – a summary

4MA1

- Short answer questions
- Extended response questions which generally have a maximum of 6 marks
- Problem solving and reasoning questions

4MB1

- Short answer questions (in Paper 1)
- Extended response questions which generally have up to 10 – 16 marks (Paper 2)
- Problem solving and reasoning questions

Activity 1

- Work through the grade 5 question shown for 4MB1 and then the grade 8 question for 4MA1
- What skills are being assessed?
- Do they represent problem solving?
- Are you convinced about the claim that the level 8 question is a good preparation for A level?

What types of questions are asked – a summary

(a) Write 0.000 015 96 in standard form.

$$1.596 \times 10^{-5}$$

(1)

The star, Sirius, is approximately 81 460 000 000 000 km from Earth.
Light from Sirius takes approximately 3142.7 days to reach Earth.

Need to use $S = D/T$
 $T = 3142.7 \times 24 \times 60 \times 60$

(b) Calculate the speed, in km/s to one significant figure, that light travels from Sirius to Earth.

Give your answer in standard form.

Show your working clearly.

The numbers are so big that students will have to enter calculations in standard form.

(4)

An answer just written down would score no marks.

Mathematical Skills

4MA1

4MA1 – overarching mathematical skills

As well as testing knowledge of the content of the course students are assessed on their ability to:

- Solve problems both in a mathematical setting and in a practical setting
- Show reasoning, interpreting and communication skills.

4MA1 – overarching mathematical skills

Problem solving

450 students were asked how they travelled to school on Monday.
Each student walked or travelled by bus or travelled by car or travelled by bicycle.
Each student used just one method of travel.

One of these students is chosen at random.
The table shows information about the probability of each method of travel.

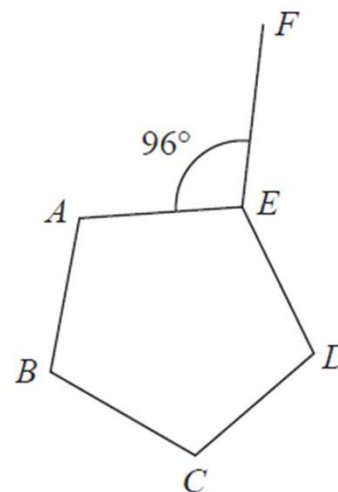
Method of travel	walk	bus	car	bicycle
Probability	0.20	x	$2x$	0.26

Work out how many of the 450 students travelled by car.

4MA1 – overarching mathematical skills

Show reasoning, interpreting and communication skills.

In the diagram, $ABCDE$ is a regular pentagon.



Angle $AEF = 96^\circ$

Work out the size of the obtuse angle FED
Show your working clearly.

Activity 2

- **Work through the previous two questions.**
- **Make a note of any issues that occur to you**

4MA1 – overarching mathematical skills

450 students were asked how they travelled to school on Monday.
Each student walked or travelled by bus or travelled by car or travelled by bicycle.
Each student used just one method of travel.

One of these students is chosen at random.
The table shows information about the probability of each method of travel.

Method of travel	walk	bus	car	bicycle
Probability	0.20	x	$2x$	0.26

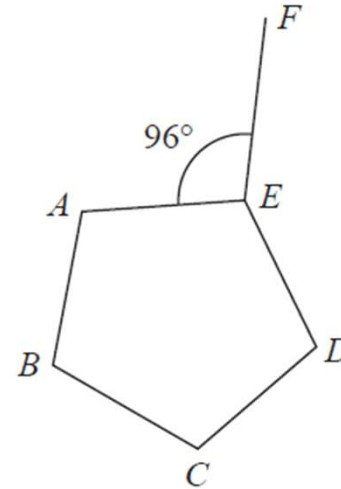
Work out how many of the 450 students travelled by car.

The plan for this is:

- Use the fact that the sum of the probabilities is 1 to find x
- Double the value of x
- Multiply this by 450

4MA1 – overarching mathematical skills

In the diagram, $ABCDE$ is a regular pentagon.



Angle $AEF = 96^\circ$

Work out the size of the obtuse angle FED
Show your working clearly.

One possible plan is:

- Work out the interior angle of this pentagon
- Add this to 96
- Subtract the answer from 360

4MA1 – overarching mathematical skills

Relationship of problem solving and mathematical reasoning skills to papers.

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

4MB1

Overview of the specification 4MB1

Paper 1 (2 hours)	Paper 2 (2 hours)
<ul style="list-style-type: none">•Externally assessed•Availability – May/June and Nov	<ul style="list-style-type: none">•Externally assessed•Availability – May/June and Nov
33⅓ % of the total International GCSE	66⅔ % of the total International GCSE

4 MB1– Higher Tier

Assesses all the content in the specification at grades 4 – 9

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

4 MB1 – Higher Tier

5 Matrices

What students need to learn	Notes
A Representation of data by a matrix	
B Addition and multiplication of matrices	An understanding of ideas of how to perform row and column multiplication, of order not more than 3×3 , for these operations will be expected
C Multiplication of a matrix by a scalar	
D Unit (identity) matrix and zero (null) matrix	Of order not more than 3×3
E Determinants and inverses of non-singular 2×2 matrices	Knowledge of singular matrices is not required
F Transformations of the plane associated with 2×2 matrices	Transformations include: Reflections in $x = 0, y = 0$ and $y = \pm x$ Rotations about the origin Enlargements with centre at the origin
G Combination of transformations	The matrix AB represents the transformation represented by B followed by the transformation represented by A

4MB1 – overarching mathematical skills

Relationship of problem solving and mathematical reasoning skills to papers.

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

4MB1 – overarching mathematical skills

Reasoning, Interpretation and communication

10

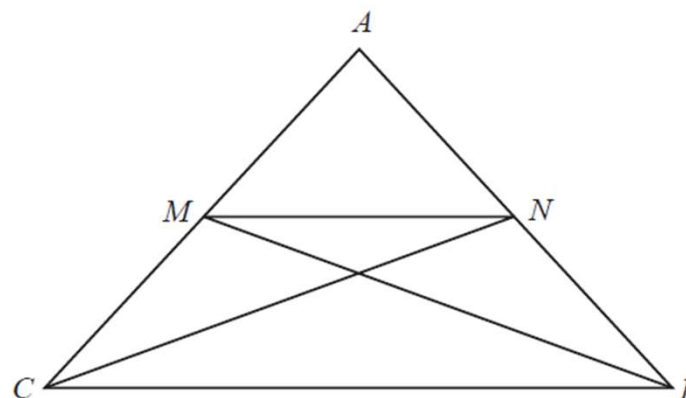


Diagram **NOT**
accurately drawn

The diagram shows the isosceles triangle ABC where $AC = AB$

M is the midpoint of AC

N is the midpoint of AB

Prove that triangle MCB is congruent to triangle NBC

3 marks

4MB1 – overarching mathematical skills

Problem Solving

27 The equation of a curve is $y = a + bx^{-1} - 9x^{-2}$ where a and b are constants.

The maximum point on this curve is $(3, 4.4)$

Find the value of a

5 Marks

Activity 3

- Work through the previous two questions.
- Make a note of any issues that occur to you

4MB1 – overarching mathematical skills

10

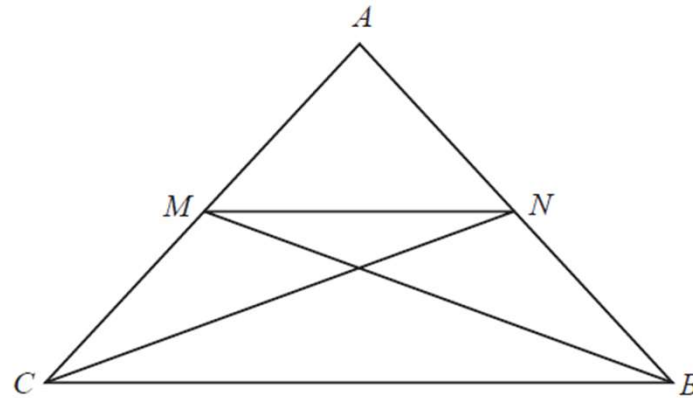


Diagram **NOT**
accurately drawn

The diagram shows the isosceles triangle ABC where $AC = AB$

M is the midpoint of AC

N is the midpoint of AB

Prove that triangle MCB is congruent to triangle NBC

A suitable plan to communicate the answer is

MN is common to both triangles

MC and NB are equal in length

Angles CMN and BNM are equal

4MB1 – overarching mathematical skills

27 The equation of a curve is $y = a + bx^{-1} - 9x^{-2}$ where a and b are constants.

The maximum point on this curve is $(3, 4.4)$

Find the value of a

A suitable plan for this is:

Use the fact that $y = 4.4$ when $x = 3$ to get one equation in a and b

Differentiate the expression in x

Use the fact that the derivative = 0 at $x = 3$ to find the value of b

Use the first equation together with the found value of b to find the value of a

**How do I make sure I cover
all of the content?**

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.
- Approved textbooks

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)

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	

This is the content that must be taught.

Examples clarifying the content.

Scheme of work

Pearson
edexcel 

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

Two-year Scheme of Work

For first teaching from September 2016

An example of a lesson plan from the Scheme of Work

Problem solving and reasoning are embedded

Common misconceptions

Teaching approach/idea

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 in relation to 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

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	

Mark Schemes and Examiner Reports

Mark Schemes

What are mark schemes?

- These give the answers to the questions
- They often give a range of responses a student might give
- They also advise markers of common errors
- Examiners use the mark scheme positively and look to reward marks for correct work seen rather than penalise candidates for what is not seen.

What types of marks are awarded?

M marks – are Method marks. In the case of a single method mark, the whole method must be complete for the award of the mark.

A marks – are Accuracy marks. This mark is awarded for the correct answer. The A mark is, however, dependent on the corresponding M mark being awarded.

If the correct answer comes from an incorrect method, in which case the M mark is not awarded, then the A mark will also not be awarded.

B marks – are independent marks. They are awarded for a correct answer seen. These marks are often used in questions with the command ‘write down’, where the answer is not the result of a calculation or method.

Typically, 55 – 60 M
25 – 30 A
15 – 20 B

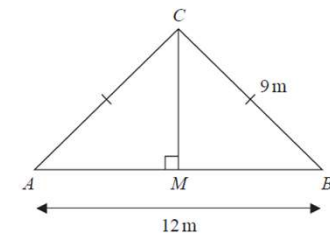
What is in a mark scheme?

When constructing a mark scheme, the exam writer will be thinking about the overall strategy a successful student will use to answer the question:

So:-

- Find the length of CM – from symmetry and Pythagoras
- Find the total length of all 4 lines
- Round up the total length and multiply by 21.50
- Write down the answer!

26 The diagram shows a roof support.



The roof support is made from four lengths of wood, AB , AC , BC and MC

$$AC = BC = 9 \text{ m} \quad AB = 12 \text{ m}$$

$$\text{angle } AMC = 90^\circ$$

Lewis is going to buy lengths of wood to make the roof support.

The wood costs 21.50 euros per metre.

Each length of wood he buys has to be a whole number of metres.

Work out the total cost of the wood Lewis needs to buy.
Show your working clearly.

What is in a mark scheme?

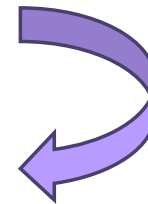
Overall Strategy

Find the length of CM – from symmetry and Pythagoras **2 marks**

Find the total length of all 4 lines

Multiply the total length by 21.50

Write down the answer!



1 mark

1 mark

Activity 4

This activity asks you to allocate 4 marks to a question from 4MB1 paper 1

18 A regular polygon has n sides.

Each interior angle of the regular polygon is $2x^\circ$

Each exterior angle of the regular polygon is $\left(\frac{x - 54}{2}\right)^\circ$

Find the value of n

What is in a mark scheme?

Consider the overall strategy a successful student will use to answer the question:

So:-

- A: Set up an equation in x using the sum of the interior angle and exterior angle = 180°
- B: Solve the equation to find x
- C: Use the found value of x and use the exterior angle of a regular polygon = $360 \div n$
- D: Write down the answer!

What is in a mark scheme?

A	$2x + \frac{x-54}{2} = 180$ oe		4	M1 se
B	$4x + x = 360 + 54$ or $2x + \frac{1}{2}x = 180 + 27 \Rightarrow x = 82.8$			M1 d terms nume Awar
C	$\frac{360}{(180 - 2 \times "82.8")}$ or $\frac{360}{\left(\frac{"82.8" - 54}{2}\right)}$ Or $2 \times "82.8" = \frac{90(2n-4)}{n}$ or $\frac{"82.8" - 54}{2} = \frac{360}{n}$ Or $2 \times "82.8" = \frac{180(n-2)}{n}$			M1 fo identi
D	<i>cas</i>	25		A1

Note the alternative approaches; the "82.8" denotes the use of the student's value

How do they all fit together?

- Senior examiners will use the content and assessment objectives to devise the questions and the mark schemes.
- The exam paper will not only satisfy the percentage of content in the assessment objectives, but also the percentage of questions for each grade.
- The following two slides show a question and its mark scheme.

How do they
all fit
together?

(b) Solve $\frac{2x+3}{5} + \frac{6x-5}{4} = \frac{163}{100}$

Show clear algebraic working.

4 marks

What is in a mark scheme?

eg $\frac{4(2x+3)+5(6x-5)}{20} (=1.63)$ oe or $\frac{40x+60}{100} (+) \frac{150x-125}{100} \left(= \frac{163}{100} \right)$ oe $4(2x+3) + 5(6x-5) = 1.63 \times 5 \times 4$ oe		4	M1	Writing fractions over a common denominator (can be 2 fractions) or for a method to remove the denominator by multiplying each term by eg 20 or 100 etc (if expanded numerator, allow one error) or $20(2x+3) + 25(6x-5) = 163$ (could all be written over 100)
eg $8x + 12 + 30x - 25 = 32.6$ or $40x + 60 + 150x - 125 = 163$ or $\frac{190x-65}{100} = \frac{163}{100}$ or $\frac{38x-13}{20} = \frac{163}{100}$ oe			M1	Removing brackets and fractions on the LHS in an equation with no more than one error from expanding on the numerator or an equation with terms on numerator of fraction simplified with no more than one error from expanding on the numerator
$8x + 30x = 32.6 - 12 + 25$ or oe eg $38x = 45.6$ or $190x = 228$			M1	Terms in x on one side and number terms the other in a correct equation.
<i>working required</i>	1.2		A1	oe dep on M1

What is in a mark scheme?

Alternative methods

<p>eg $\frac{4(2x+3)+5(6x-5)}{20} (=1.63)$ oe or</p> <p>$\frac{40x+60}{100} (+) \frac{150x-125}{100} \left(= \frac{163}{100} \right)$ oe</p> <p>$4(2x+3) + 5(6x-5) = 1.63 \times 5 \times 4$ oe</p>		4	<p>M1 Writing fractions over a common denominator (can be 2 fractions) or for a method to remove the denominator by multiplying each term by eg 20 or 100 etc (if expanded numerator, allow one error) or $20(2x+3) + 25(6x-5) = 163$ (could all be written over 100)</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	---	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

This describes what the student has to show to get the first M mark

What is in a mark scheme?

eg $8x + 12 + 30x - 25 = 32.6$ or $40x + 60 + 150x - 125 = 163$ or $\frac{190x - 65}{100} = \frac{163}{100}$ or $\frac{38x - 13}{20} = \frac{163}{100}$ oe			M1 Removing brackets and fractions on the LHS in an equation with no more than one error from expanding on the numerator or an equation with terms on numerator of fraction simplified with no more than one error from expanding on the numerator
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Keeping track of the next stage of the different methods shown for the first M mark

What is in a mark scheme?

Note at this stage the working must be accurate to earn the M mark

$8x + 30x = 32.6 - 12 + 25$ or oe eg $38x = 45.6$ or $190x = 228$		M1	Terms in x on one side and number terms the other in a correct equation.
<i>working required</i>	1.2	A1	oe dep on M1

Note that no marks will be given without some working shown (even if the correct answer is found)

Activity 5

This activity gives you the opportunity to use a mark scheme on some student answers on a recent exam paper.

Activity 5

A : M1M1M1A0

B : M1M1M1A0

C : M0M0M0A0

D : B1M0A0

E : B1M1A0

F : B1M1A1

The exam paper

Please check the examination details below entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

Pearson Edexcel International GCSE

Thursday 15 May 2025

Morning (Time: 2 hours)

**Paper
reference**

4MA1/1H

Mathematics A

PAPER 1H

Higher Tier

A black and white illustration of a scientific calculator with a screen and various buttons.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
– use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ►

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The exam paper

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.	Total Marks
---------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------

Students should try to answer every question. Often some marks can be picked up by weaker students on questions at the end of the paper.

Good students check their answers:

- Is my answer reasonable?
- Can I check using substitution?
- Can I use approximations?

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
- Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

However, if a student needs more space, they can ask for A4 size paper and hand it in with their completed question paper.

There are 100 marks to be answered in 120 minutes. Some questions will be answered faster than others. Encourage students to **THINK** about questions which may be puzzling at first sight. There is time!

Turn over

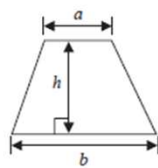
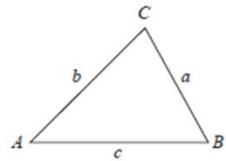
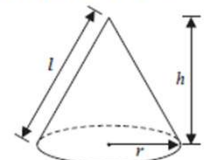
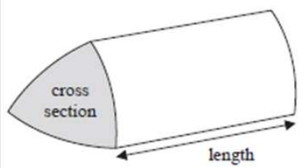
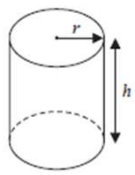
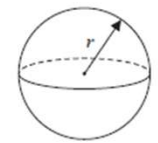
The formula sheet

This is the 4MA1 Formula sheet
Higher Tier

They may be questions for which formulas have to be learned!

They are not on the formula sheet,

International GCSE Mathematics Formulae sheet – Higher Tier

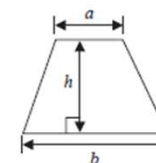
<p>Arithmetic series Sum to n terms, $S_n = \frac{n}{2} [2a + (n-1)d]$</p>	<p>Area of trapezium = $\frac{1}{2}(a+b)h$</p> 
<p>The quadratic equation The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$</p>	
<p>Trigonometry</p> 	<p>In any triangle ABC 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 triangle = $\frac{1}{2}ab \sin C$</p>
<p>Volume of cone = $\frac{1}{3}\pi r^2 h$ Curved surface area of cone = $\pi r l$</p> 	<p>Volume of prism = area of cross section \times length</p> 
<p>Volume of cylinder = $\pi r^2 h$ Curved surface area of cylinder = $2\pi r h$</p> 	<p>Volume of sphere = $\frac{4}{3}\pi r^3$ Surface area of sphere = $4\pi r^2$</p> 

The formula sheet

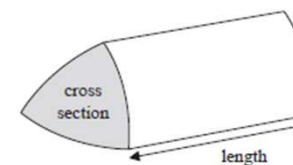
This is the 4MA1 Formula sheet
Foundation Tier

International GCSE Mathematics Formulae sheet – Foundation Tier

$$\text{Area of trapezium} = \frac{1}{2}(a + b)h$$

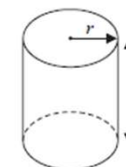


$$\text{Volume of prism} = \text{area of cross section} \times \text{length}$$



$$\text{Volume of cylinder} = \pi r^2 h$$

$$\text{Curved surface area of cylinder} = 2\pi r h$$



The formula sheet

4MB1 Paper 1 does not have a formula sheet

4MB1 Paper 2 does not have a formula sheet

Any formulae that candidates are not expected to know (see the specification for a list of these) will be given in any question where it is relevant

Examiner Reports

Examiner reports

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

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

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

Examiner reports

14. Factorise fully $50g^2 - 18$

.....
(Total for question = 3 marks)

Examiner reports

14. Factorise fully $50g^2 - 18$

Q	Working	Answer	Mark	Notes
		$2(5g + 3)(5g - 3)$	3	B3 for $2(5g + 3)(5g - 3)$ B2 for $2(5g \pm 3)(5g \pm 3)$ oe eg $2(5g - 3)^2$ B1 for $2(25g^2 - 9)$ or $(10g + 6)(5g - 3)$ or $(5g + 3)(10g - 6)$ or $(5g + 3)(5g - 3)$
				Total 3 marks

Examiner reports

Question 14

The majority of students were not able to gain the full 3 marks on this question. The most common scores seen were 0 and 1, with 1 mark often awarded for either $2(25g^2 - 9)$ or $(5g + 3)(5g - 3)$. Some students found the difference of two squares using surds $(5\sqrt{2}g + 3\sqrt{2})(5\sqrt{2}g - 3\sqrt{2})$ which scored 0.

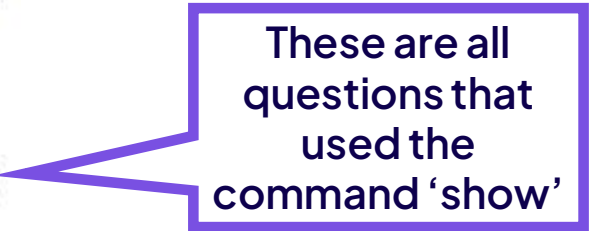
Examiner reports

As well as question by question analysis there are always a teaching and learning summary at the end of a report.

Below is the one from a recent Mathematics B report

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 used the command 'show'

Examiner reports

9 A car travels at an average speed of 80 km/h for 2.5 hours and then travels a further distance of 25 km in 0.5 hours.

Calculate the average speed, in km/h, of the car for the whole journey.

..... km/h

(Total for Question 9 is 3 marks)

Examiner reports

Question		Working	Answer	Mark	Notes
9		$80 \times 2\frac{1}{2} [= 200]$ or $80 \times 2\frac{1}{2} + 25 [= 225]$ oe		3	M1 Correct method to find the distance in 2.5 hours (could be part of calculation to find the total distance or in a correct calculation to find the average speed) Ignore any incorrect units
		$\frac{80 \times 2.5 + 25}{2.5 + 0.5}$ or $\frac{"200" + 25}{2.5 + 0.5}$ oe			M1 <u>Correct</u> method to find speed using total distance/ total time or allow a distance other than 200 provided it is clearly labelled as the distance in the first part of the journey and is not equal to 80 Ignore any incorrect units
			75		A1 ignore any additional incorrect units isw further calculations for the method marks but not for the accuracy mark
					<i>Total 3 marks</i>

Examiner reports

Question 9

Many candidates did not fully appreciate that they were required to work out (TOTAL distance)/(TOTAL time). In many cases where no marks were earned, candidates simply added the two average speeds together ($80 + 50$) and divided by 2. In some cases, the distance was halved to 12.5, whilst others divided 80 by 2.5 rather than multiplying them. Of those candidates who correctly determined the distance travelled for the first part of the journey (200 km), picking up a method mark for doing so, a significant number added this to 12.5 instead of 25 and so no further marks were awarded.

A few attempted to work in minutes, or even seconds but did not convert all numbers to the relevant units in order to combine them correctly. Candidates should be reminded to check the reasonableness of their answers as some gave totally unrealistic values for the average speed, having multiplied their distances together, rather than adding them.

Activity 6

With your knowledge of how to teach the specification and understanding of mark schemes and examiner reports, consider how you would teach the topic of reverse percentage

Activity 6

Pre-knowledge

- A whole string of techniques! But students should know how to work out the final amount given the initial amount and the percentage change.
- They should do this by using **multipliers** e.g. an increase of 10% means a multiplier of $110/100$ (or 1.1)
- So $\text{original value} \times 1.1 = \text{final value}$ and thus $\text{original value} = \text{final value} \div 1.1$
- Clear links with compound interest and depreciation.

The error we see lots of is equivalent to 10% off the final value (from the example above)

How can I teach good exam technique?

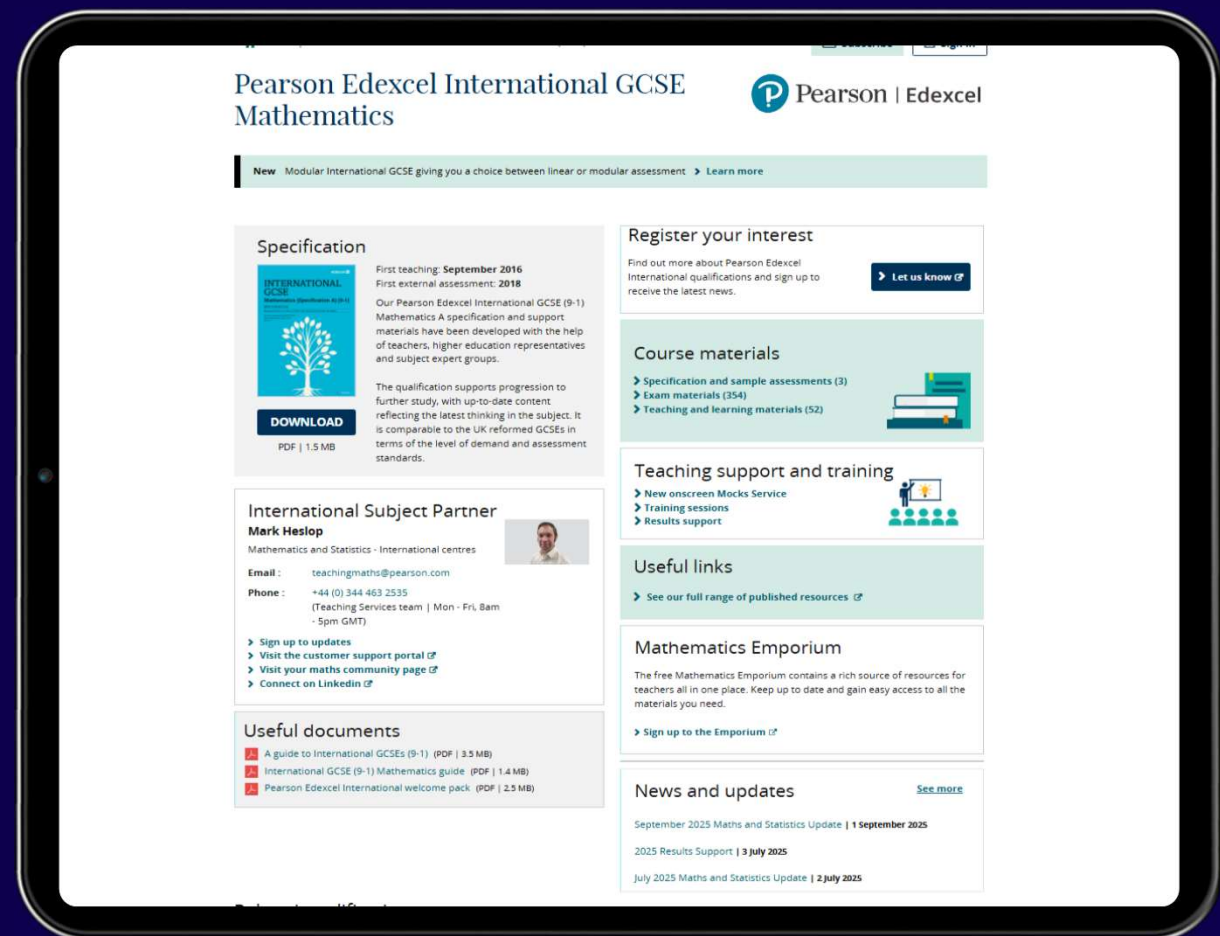
- Ensuring that students practise using a whole paper and understand how it is laid out.
- Understand the importance of looking at the mark allocation.
- Read the whole question first, before any attempt is made to answer it.
- Always show complete methods – an examiner can only assess what a student is thinking by their written work in the examination paper.
- Encouraging students to write neatly and work in an orderly manner.
- Understanding that we always provide more than enough paper – you don't need to fill the whole booklet!
- Walking-talking mocks

Walking- talking mocks

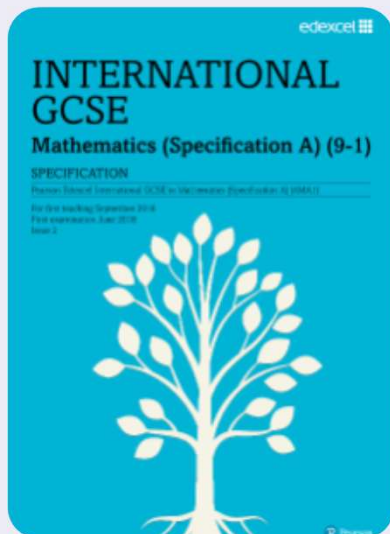
- Students sit in the same exam room where they will do their exam, preferably in the same seats
- Students are given an exam paper which is as close to being like the real thing as possible – so a ‘write-on’ exam paper
- Students are literally talked through every question on the paper – the person leading the session takes them through the smallest steps, such as underlining key words, how to plan, things to remember etc.
- Students then write their responses in timed conditions.

Support

Support for you at every Stage



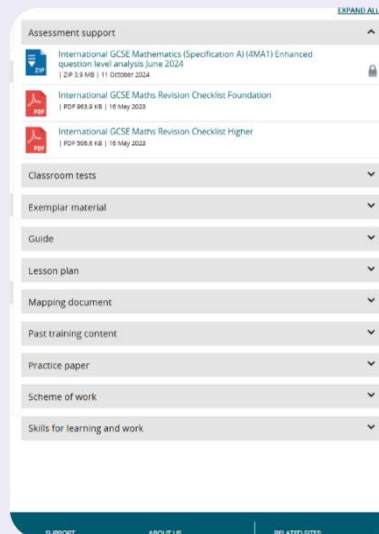
Teaching and Learning Materials



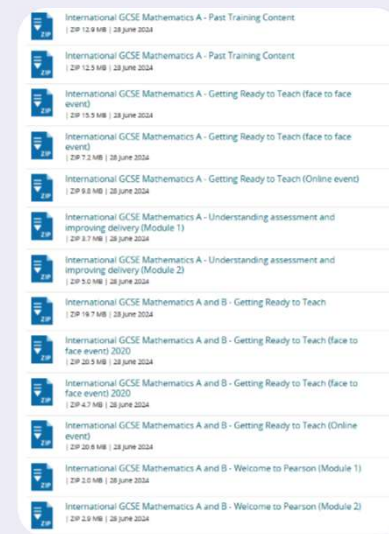
Specification



Past Papers



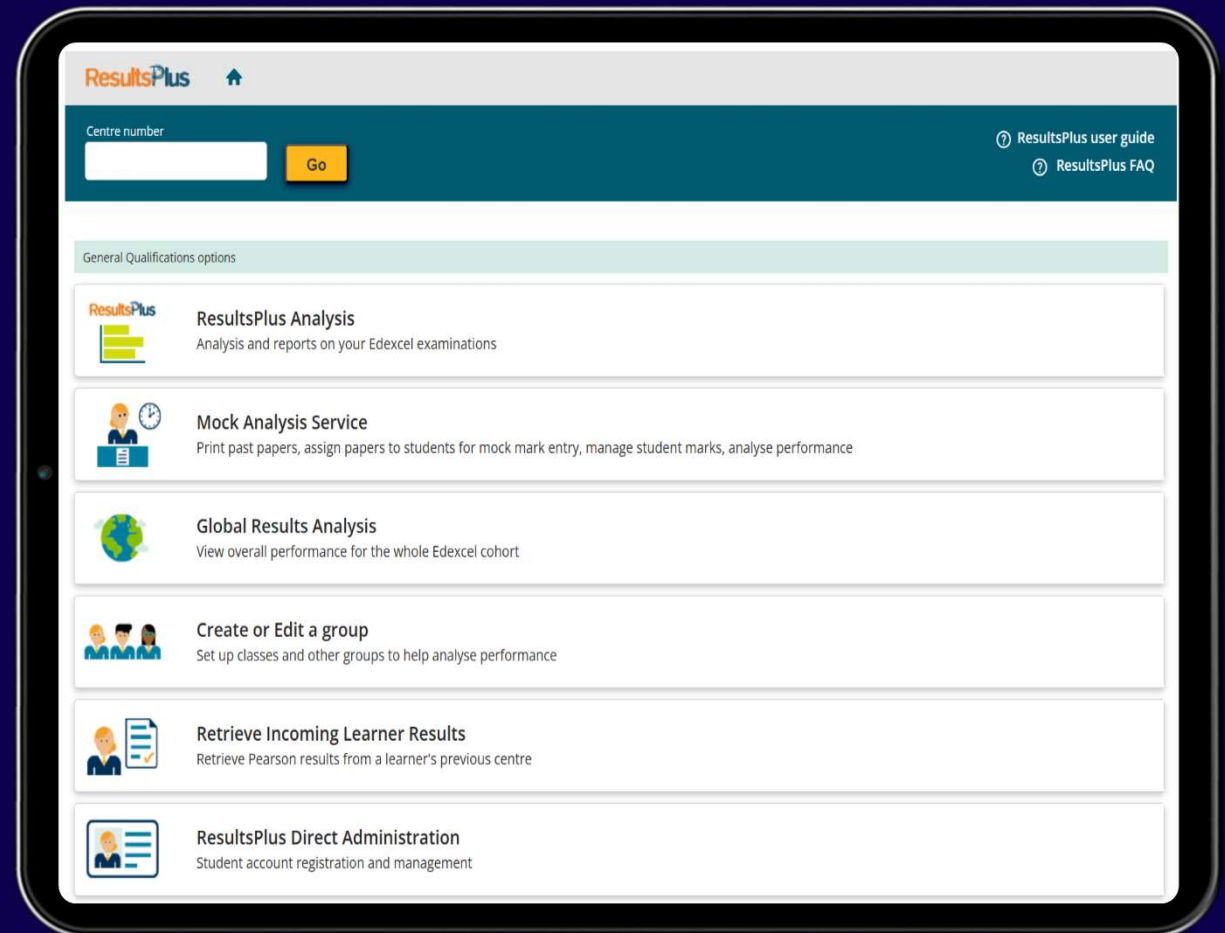
Teaching and Learning Materials



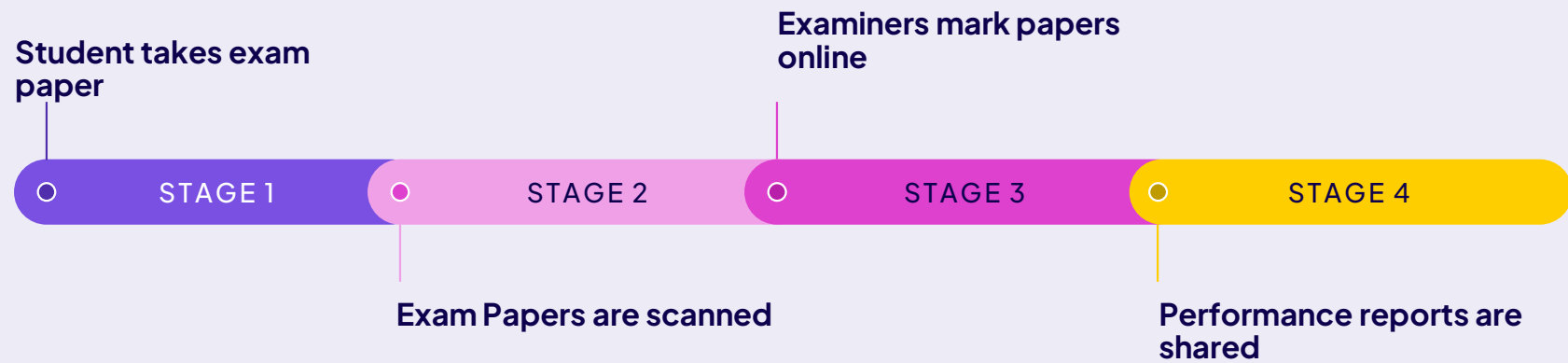
Past Training Content

Results Plus

- Provides detailed analysis of your learners performance.
- Identify potential topics, skills and types of question where students may need to develop their learning further.
- See actual scores for each exam question for a student, class or group.
- Understand how your students' performance compares with class and Pearson Edexcel national averages.
- Acquire data that may support effective learning and teaching approaches.

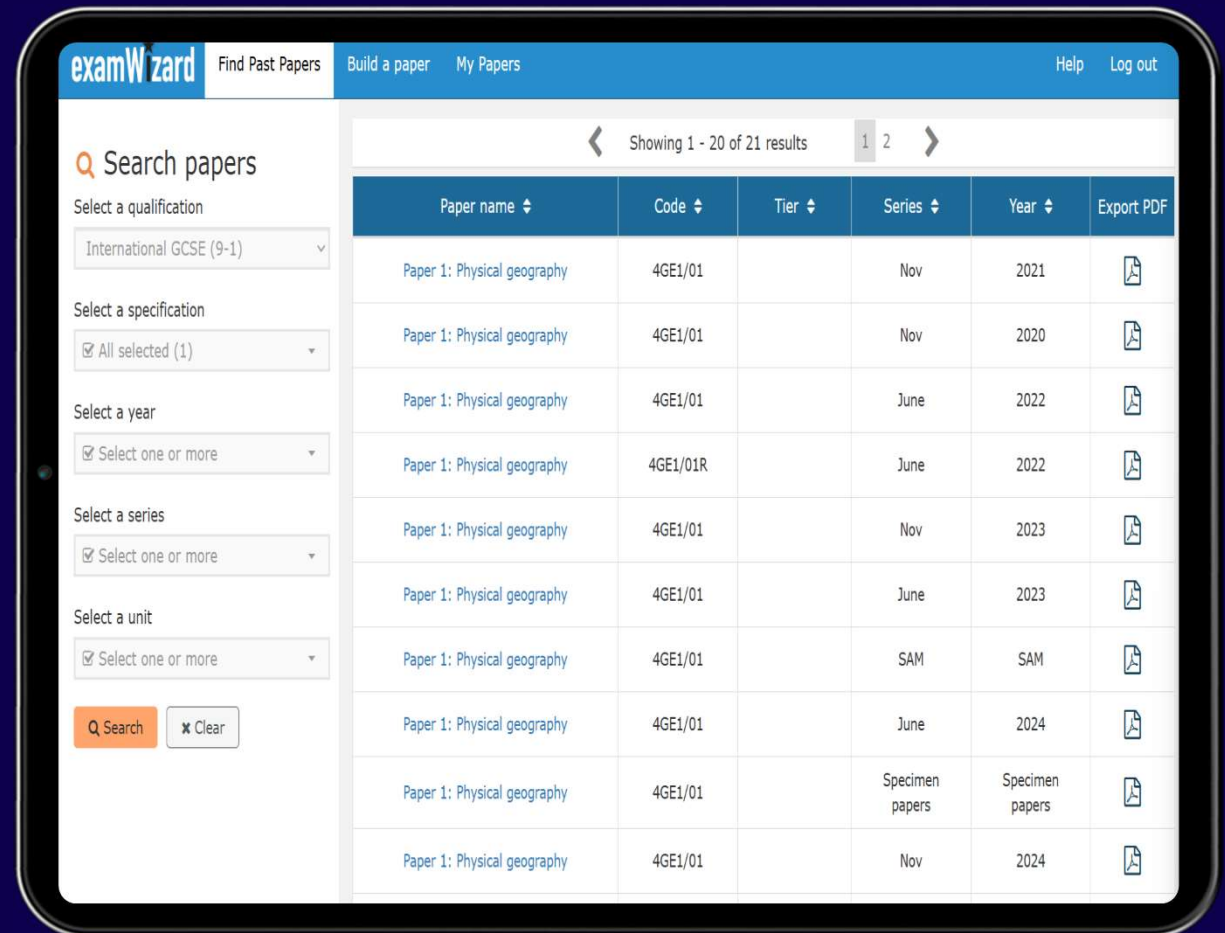


Results Plus



Exam Wizard

- Saves time by creating your own mock paper exams, topic tests, homework or revision activities.
- Uses our Pearson back catalogue of exam questions to practice and develop these skills with your learners'.
- Gain access to past papers and test questions to create tailored learners plans, which target individuals weaknesses.
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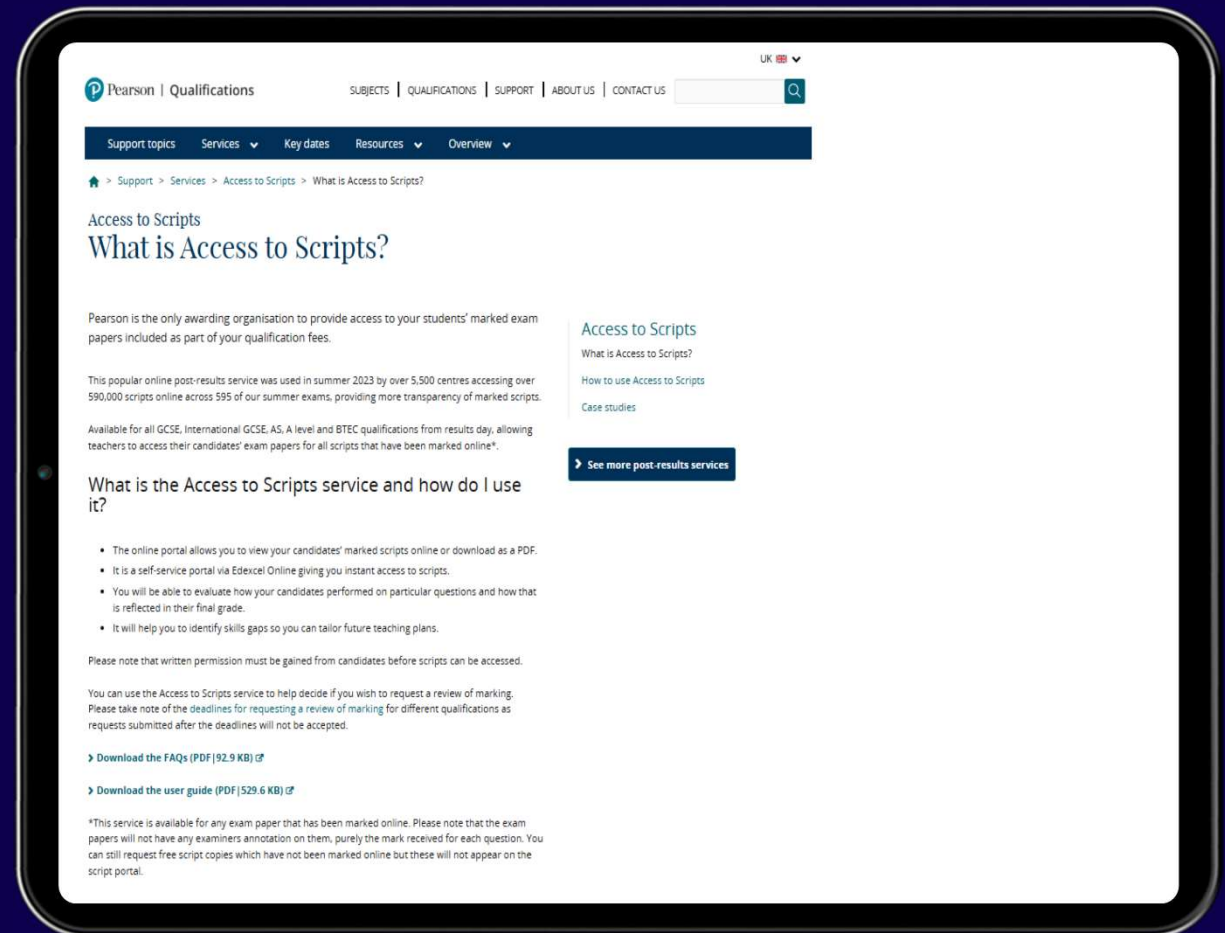


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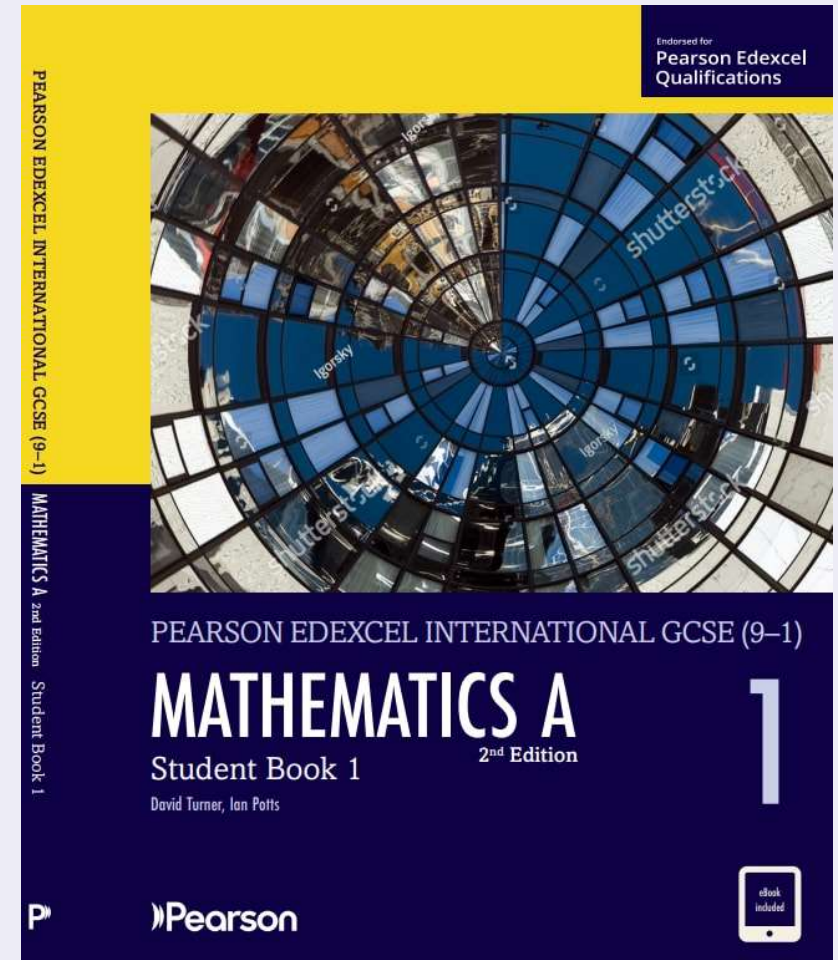


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Questions



Thank you