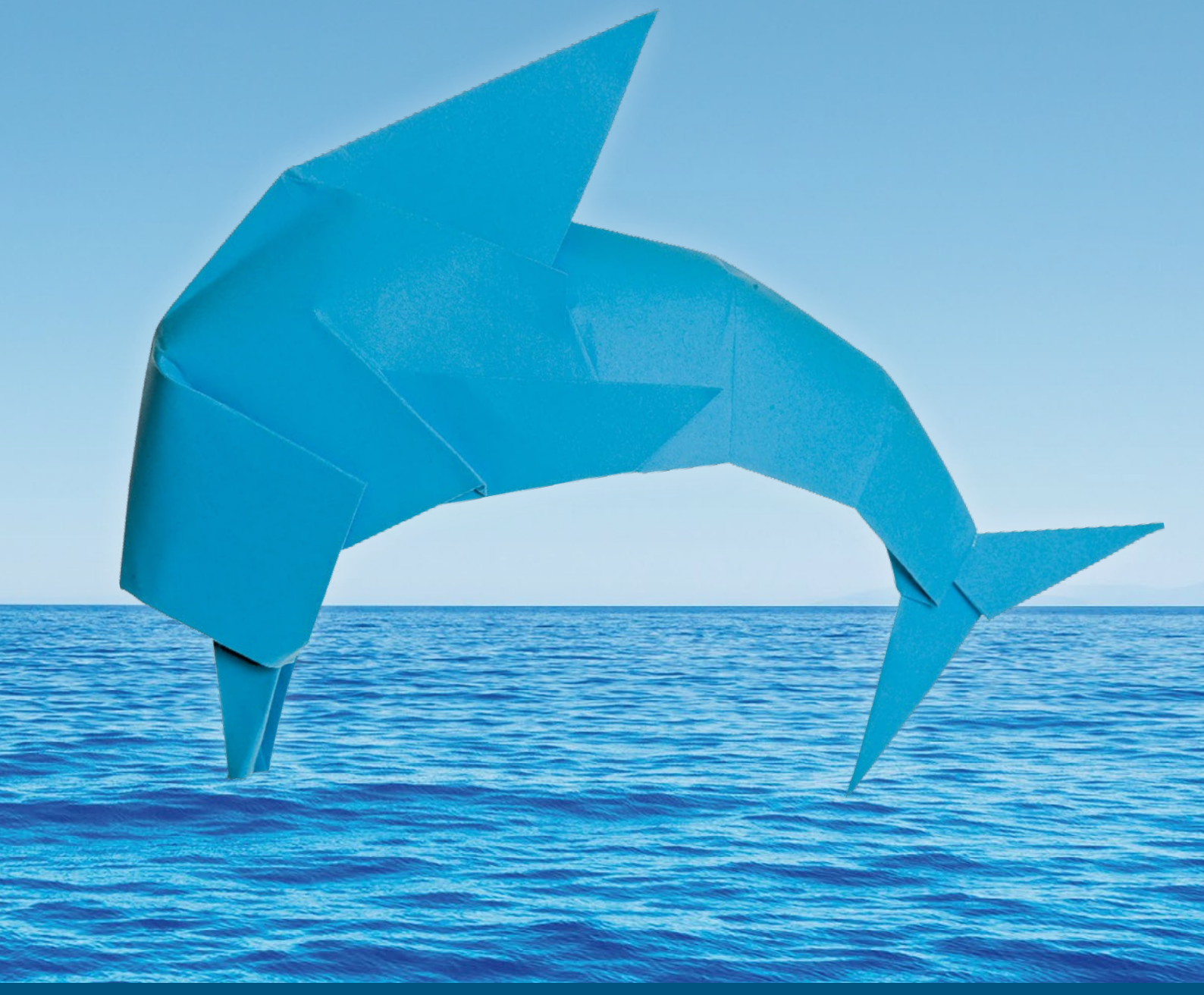
edexcel

Edexcel GCSE Mathematics (9-1)

Mathematics from 2016: post-16 resits

Your guide to our new GCSE (9-1) Mathematics qualification as a resit, post-16



ALWAYS LEARNING

PEARSON

Teaching new Edexcel GCSE (9-1) Mathematics **as a resit, post-16**

We know that when your students are studying GCSE Maths as a resit, they might need some specific support with the demands of this new qualification.

We're also aware that there will be staff teaching GCSE for the first time in your FE or Sixth Form College.

We can support you and your students in teaching and learning new GCSE (9-1) Maths post-16.

Turn over to find out how.

What's in this guide?

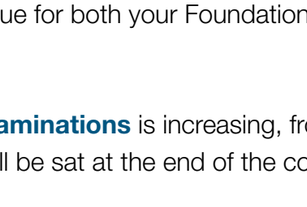
GCSE Mathematics is getting more demanding

GCSE Maths is going to change and get more demanding for everyone:

- The **volume of subject content** has increased. You may need more time to teach it.
- The **demand of that content** is increasing too, with harder topics being introduced. This is true for both your Foundation Tier students and Higher Tier students.
- The **total time for the examinations** is increasing, from 3 ½ hours to 4 ½ hours. All exams will be sat at the end of the course.
- There are **fewer marks at the lower grades** and **more marks at the higher grades** at both Foundation Tier and Higher Tier.
- A **new grading structure** is being introduced, from grade 9 to 1, to replace the familiar A* to G grading scale.
- In the assessments there's a greater emphasis on **problem solving** and **mathematical reasoning**, with more marks now being allocated to these higher-order skills.
- Students will be required to memorise formulae – **fewer formulae will be provided in examinations**.

Together these changes are designed to help students emerge from GCSE Maths with a level of confidence and fluency that will provide a genuine foundation for the rest of their learning and working lives.

Find all our support on
www.edexcel.com/gcsemaths2015guide



Supporting great Maths teaching

Support resources specifically designed to help you plan and deliver GCSE Maths as a resit post-16

- Planning documents and tools to help you build your schemes of work, PD training and assessment materials for help with planning and delivery.
- Digital and editable one-year course planners and Schemes of Work, transition resources and strategies for that first transition year from current to new GCSE.

Assessment support to help you understand all of your students' needs and prepare them for the exam

- Accessible live assessments available in November and summer each year.
- Support with understanding the new grading and assessments.
- Additional practice papers.
- Free past paper questions and the opportunity to build practice papers and mock exams in ExamWizard.
- Revision aids designed for students to use at home or in-class.
- In-depth analysis of students' results, and diagnostic tests and tools with ResultsPlus for understanding your students and developing learning plans.
- Free access to Emporium, our archive of qualifications materials used by tens of thousands of teachers.
- New improved mock marking service.

Qualifications training and CPD for help with post-16 delivery

- Free online and face-to-face Getting Ready to Teach events in different regions, launch events.
- Collaborative local network events in different regions.
- CPD on delivering GCSE for the first time. Non-specialist training and training on how to deliver new content, and training on problem-solving and accessing the GCSE for lower attainers.

Tools for progression tracking

- The Pearson Progression Scale and Map represent our view of how learning progresses in Maths, and how understanding and skills build upon each other. These tools give you richer insight into student performance in a way that is easy to understand and is reliable.
- ActiveLearn Digital service maps ability level to tiered topics for progression tracking (available to purchase within our Edexcel GCSE (9-1) Mathematics course).

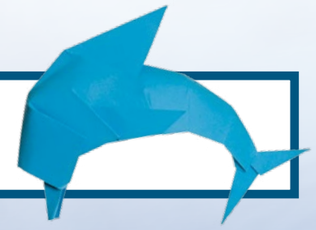
Personal support from our team of experts

- A team of highly responsive assessment experts, always available to give you what you need. Maths Emporium, direct contact with our FE team, collaborative networks and FE Maths networks. Subject expert Graham Cumming is on-hand to help.

Teaching and learning resources that nurture confidence in Maths

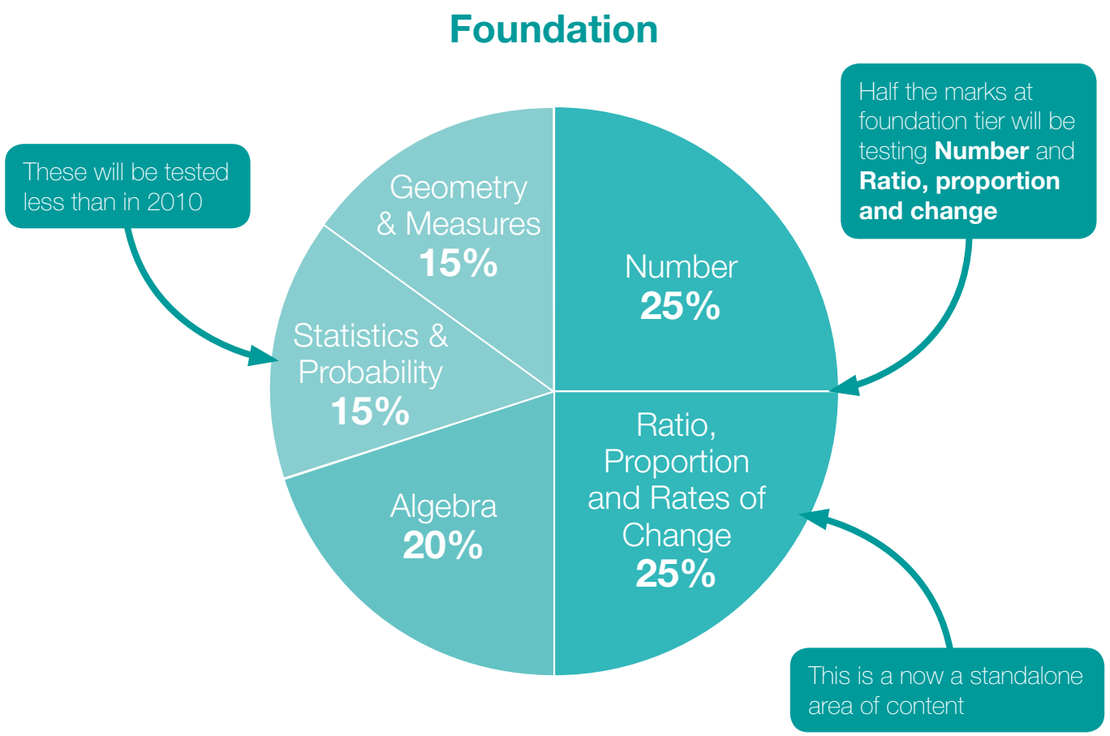
- We've developed our paid-for resources with leading experts and UK teachers, basing them on academic evidence and research into what improves learning in Maths.
- Our new resources are written specifically to tackle the increase in demand of the new GCSE Maths, embedding problem-solving and reasoning throughout.
- Gradual build of difficulty, allowing lower ability students to gain confidence.
- Clear, simple language.

Learn more at
www.edexcel.com/gcsemathspost16



Understanding the changes to content: Foundation

Foundation tier papers will assess the different content domains in these proportions:



(It's worth noting that there's a ±3% tolerance for each domain area.)

Changes to content at Foundation Tier

The biggest change to content is at Foundation tier. There are **new topics added** to the Foundation tier for 2015, which in **2010 were assessed at Higher tier only**. The list opposite is not exhaustive but includes all the major changes. Full, annotated tables for this and the following lists can be found on the GCSE Maths **support webpage**.

Find more details, visit
www.edexcel.com/gcsemathspost16

Topics new to Foundation tier (previously Higher tier only in 2010)

- Index laws: zero and negative powers (numeric and algebraic)
- Standard form
- Compound interest and reverse percentages
- Direct and indirect proportion (numeric and algebraic)
- Expand the product of two linear expressions
- Factorise quadratic expressions in the form $x^2 + bx + c$
- Solve linear/linear simultaneous equations
- Solve quadratic equations by factorisation
- Plot cubic and reciprocal graphs, recognise quadratic and cubic graphs
- Trigonometric ratios in 2D right-angled triangles
- Fractional scale enlargements in transformations
- Lengths of arcs and areas of sectors of circles
- Mensuration problems
- Vectors (**except** geometric problems/proofs)
- Density
- Tree diagrams

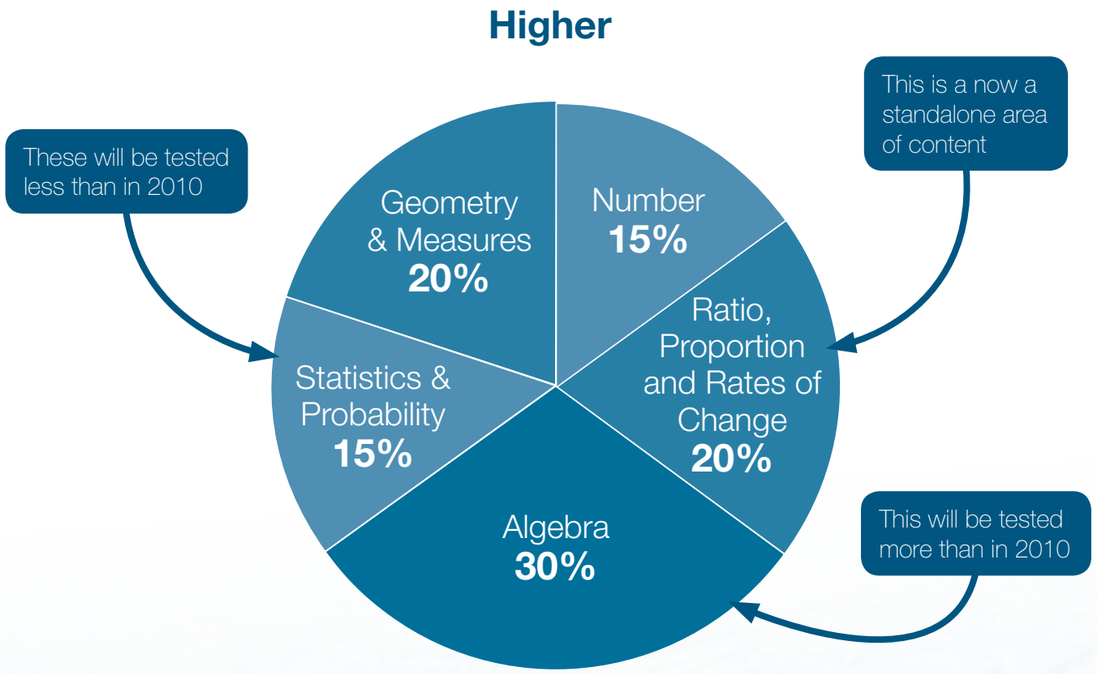
For **both tiers**, there will be **new knowledge, skills and understanding** that your students will be assessed on in the new GCSE Mathematics (9-1).

Topics new to both tiers

- Use inequality notation to specify simple error intervals
- Identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically
- Fibonacci type sequences, quadratic sequences, geometric progressions
- Relate ratios to linear functions
- Interpret the gradient of a straight line graph as a rate of change
- Know the exact values of sin θ and cos θ for $\theta = 0°, 30°, 45°, 60°$ and 90°; know the exact value of tan θ for $\theta = 0°, 30°, 45°$ and 60°

Understanding the changes to content: Higher

Higher tier papers will assess the different content domains in these proportions:



(It's worth noting that there's a ±3% tolerance for each domain area.)

More content has been added to Higher tier in order to **stretch and challenge** the most able students and better prepare them for studying A level Mathematics, so we'll see the introduction of new **knowledge, skills and understanding** that will be assessed at **Higher tier only**.

Topics new to Higher tier

- Expand the products of more than two binomials
- Interpret the reverse process as the 'inverse function'; interpret the succession of two functions as a 'composite function' (using formal function notation)
- Deduce turning points by completing the square
- Calculate or estimate gradients of graphs and areas under graphs, and interpret results in real-life cases (**not** including calculus)
- Simple geometric progressions including surds, and other sequences
- Deduce expressions to calculate the nth term of quadratic sequences
- Calculate and interpret conditional probabilities through Venn diagrams

Some content previously assessed in the current GCSE Mathematics has been omitted from the new GCSE Mathematics (9-1).

Omitted topics

- Trial and improvement
- Tessellations
- Isometric grids
- Imperial units of measure
- Questionnaires
- 3D coordinates
- Rotation and enlargement of functions

In the specification, you will see the content has been divided into three levels:

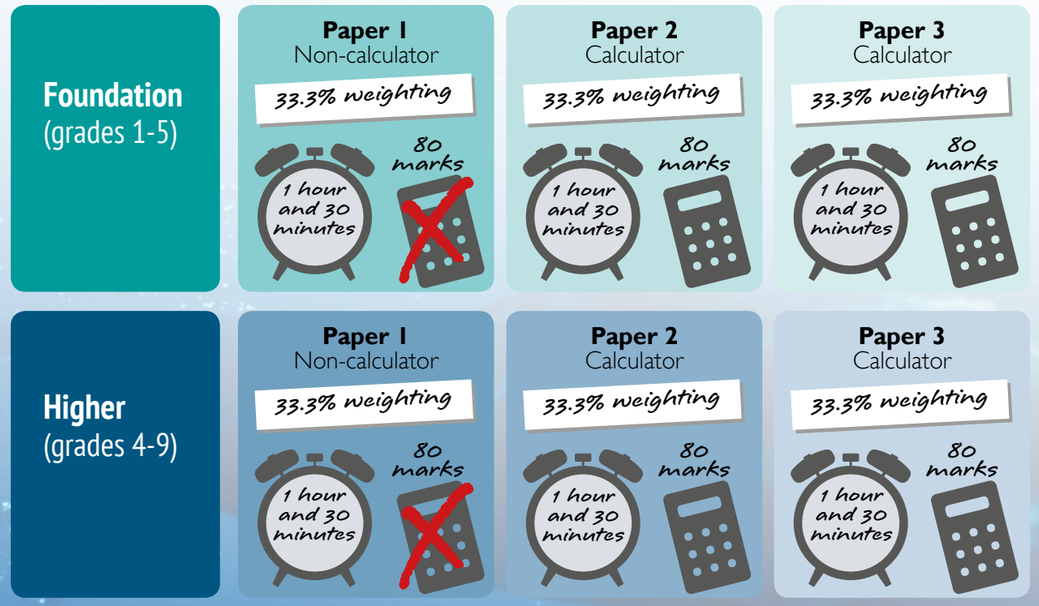
- **Standard**: this content will be assessed at both **Foundation and Higher tier**; all students should be confident and competent with it.
- **Underlined**: this content will be assessed at both **Foundation and Higher tier**; higher-attaining students should be confident and competent with it.
- **Bold**: this content will be assessed at **Higher tier only**; the highest-attaining students should be confident and competent with it.

Find more details, visit
www.edexcel.com/gcsemathspost16

Changes to assessment: summary

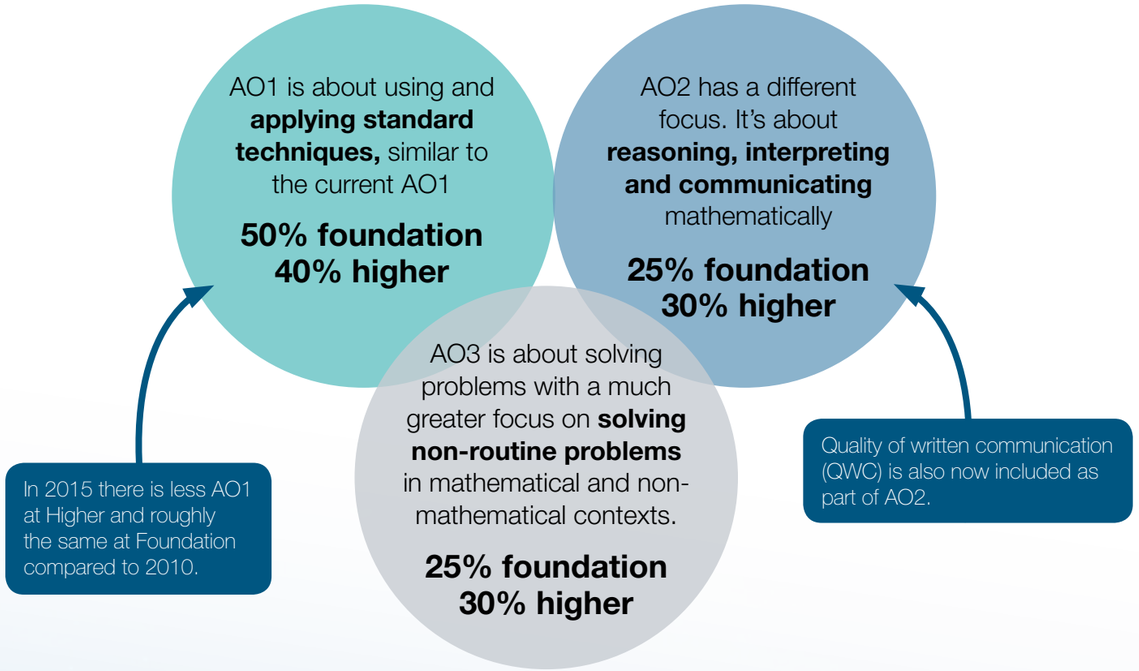
Our Edexcel GCSE in Mathematics (9–1) will be assessed through three equally-weighted written examination papers at either Foundation tier or Higher tier. Paper 1 is a non-calculator paper.

- **Availability:** May/June and November (for post-16 students only).
- **First assessment:** May/June 2017.
- **Tiers of entry:** Foundation and Higher (a student must take all 3 papers at the same tier).
- **Grading:** 9–1 overall, with questions targeted at grades 1–5 at Foundation tier and at grades 4–9 at Higher tier. See page 14 for more on the new grading, including how it relates to the current A*–G grading.
- **Types of questions:** Each paper will have a range of question types, utilising both structured and unstructured questions. Take a look at pages 16 and 17 for examples.
- **Questions in context:** Some questions on the papers will be set in context (both mathematical and non-mathematical).
- **Common questions between tiers:** Grades 4 and 5 are the overlap grades between Foundation and Higher tiers, so common questions targeted at these grades will appear in the respective papers for each tier.



Assessment objectives

The diagram below gives an overview of the **three assessment objectives**. The strands and elements are detailed in the specification. Every **strand and element** must be **assessed in every examination series**. We've shown the marks allocated to these strands and elements clearly in our mark schemes. You can learn more at **www.edexcel.com/gcsemaths2015guide**.



In both tiers, there's now more focus on AO3 than in 2010.

Condition of funding requirements from 2017

The government intends to align the new GCSE good pass in English and maths with the 16 to 19 English and maths funding condition. A phased approach will be taken. For the academic years 2017 to 2018 and 2018 to 2019 the funding condition will be based on the new GCSE grade 4.

Under the new 9-1 grading system, a "good pass" - currently a C grade - will become a grade 5 under the new scale.

Changes to assessment: grading

There will continue to be an **overlapping tiers** model at grades 4 and 5. Students who fall slightly below the grade 4 boundary on Higher tier may be awarded a grade 3.

Ofqual have defined 'anchor points' that provide broad proportions and alignments between the old A*–G and the new 9–1 GCSE grading systems, which we've shown below.

Foundation

Foundation papers now start at, and reach, a higher level.

The marks on current Foundation papers are allocated like this:

50%	25%	25%
Targeted at F/G	Targeted at grade E	Targeted at grades D/C

In the new Foundation papers, marks will be allocated like this:

Bottom of 1 aligned with bottom of G

Bottom two-thirds of C marks

Top third of C marks / bottom third of B marks

50%			50%		
1	2	lower 3	upper 3	4	5
Approximately equivalent to:					
G/F	E	D-	D+	C	C/B

Higher

Higher tier papers now start at a higher level than in the current GCSE, which starts at grade D.

The new Higher tier papers will cover 6 grades instead of 5, allowing for more differentiation at the top end of the grades. Previously, 25% of questions were targeted at A/A*, but now 50% of questions in each paper are targeted at the equivalent grades, 7–9.

In the new Higher papers, they will look like this:

Bottom two-thirds of C marks

Top two-thirds of B marks

Top third of C marks / bottom third of B marks

Top 20% of A/A* marks

50%			50%		
4	5	6	7	8	9
Approximately equivalent to:					
C	C/B	B	A	A/A*	A/A*

Formulae sheets

Students will need to memorise many of the formulae currently given in the formulae sheets at the front of the exam papers. These are:

- Volume of a prism
- Area of a trapezium
- The Quadratic equation (Higher tier only)
- The sine rule, cosine rule, and area of a triangle (Higher tier only).

There will be formulae provided within the relevant questions

Appendix 3: Mathematical formulae

The following formulae will be provided for students within the relevant examination questions.

Perimeter, area, surface area and volume formulae

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

Curved surface area of a cone $= \pi rl$

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

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

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

At-a-glance: Sample Assessment Material

Foundation and Higher tier

12 Ashten chooses three different whole numbers between 1 and 50

The first number is a prime number.
The second number is 4 times the first number.
The third number is 6 less than the second number.

The sum of the three numbers is greater than 57

Find the three numbers.

Question	Working	Answer	Mark type	AO	Notes
12	7 + 28 + 22 = 57	11, 44 and 38	P	3.1b	P1 for a correct process to develop algebraic expressions for each number and set up an inequality, e.g. $x + 4x + 4x - 6 > 57$ or for a correct trial with a prime number
			P	3.1b	P1 for a correct process to solve the inequality, e.g. $x > (57 + 6) \div 9 (= 7)$ or for a correct trial with the prime number as 7 resulting in a sum of 57
			A	1.3b	A1 cao

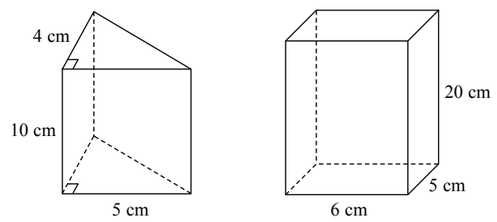
(Total for Question 12 is 3 marks)

The new **P mark** is a mark that can be awarded to a proof, a process, a numerical solution to a problem, or for evaluation of AO3.

Mark scheme

Foundation tier only

7 The diagram shows a right-angled triangular prism **A** and a cuboid **B**.



Show that the volume of **B** is 6 times the volume of **A**.

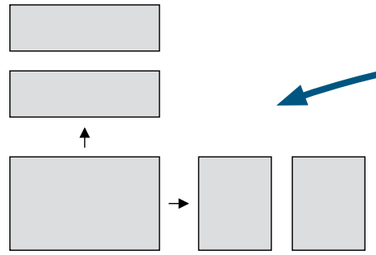
Question	Working	Answer	Mark	AO	Notes
7		Show	M	1.1	M1 for Use of correct formula for volume for triangular prism or cuboid, e.g. $\frac{1}{2} \times 4 \times 10 \times 5 (= 100)$ **or** $6 \times 20 \times 5 (= 600)$
			P	2.2	P1 for beginning to construct chains of reasoning, e.g. $\frac{1}{2} \times 4 \times 10 \times 5 (= 100)$ **and** $6 \times 20 \times 5 (= 600)$
			C	2.2	C1 for completion of chains of reasoning, e.g. $600 \div 100 = 6$

The same clear layout of questions you're familiar with

Mark scheme

Higher tier only

12 A rectangular sheet of paper can be cut into two identical rectangular pieces in two different ways.



When the original sheet of paper is cut one way, the perimeter of each of the two pieces is 50 cm.

When the original sheet of paper is cut the other way, the perimeter of each of the two pieces is 64 cm.

What is the perimeter of the original sheet of paper?

Question	Working	Answer	Mark	AO	Notes
12	Let h and w be the dimensions of the original rectangle	76 cm	P	3.2	P1 for correct process to set up equations, e.g. $\frac{h}{2} + \frac{h}{2} + w + w = 50$ and $\frac{w}{2} + \frac{w}{2} + h + h = 64$
	$h + 2w = 50$ $2h + w = 64$ $w = 12,\ h = 26$		P	3.1d	P1 for correct process to find value of one variable
			P	3.1d	P1 for correct process to find value of other variable
	Perimeter = $2 \times 12 + 2 \times 26$		P	3.1d	P1 for correct process to find numerical value of perimeter, e.g. $2 \times ('12' + '26')$
			A	1.3b	A1 cao

(Total for Question 12 is 5 marks)

This question shows problem solving in the new AO3

Straightforward mark schemes to show what's required in student answers

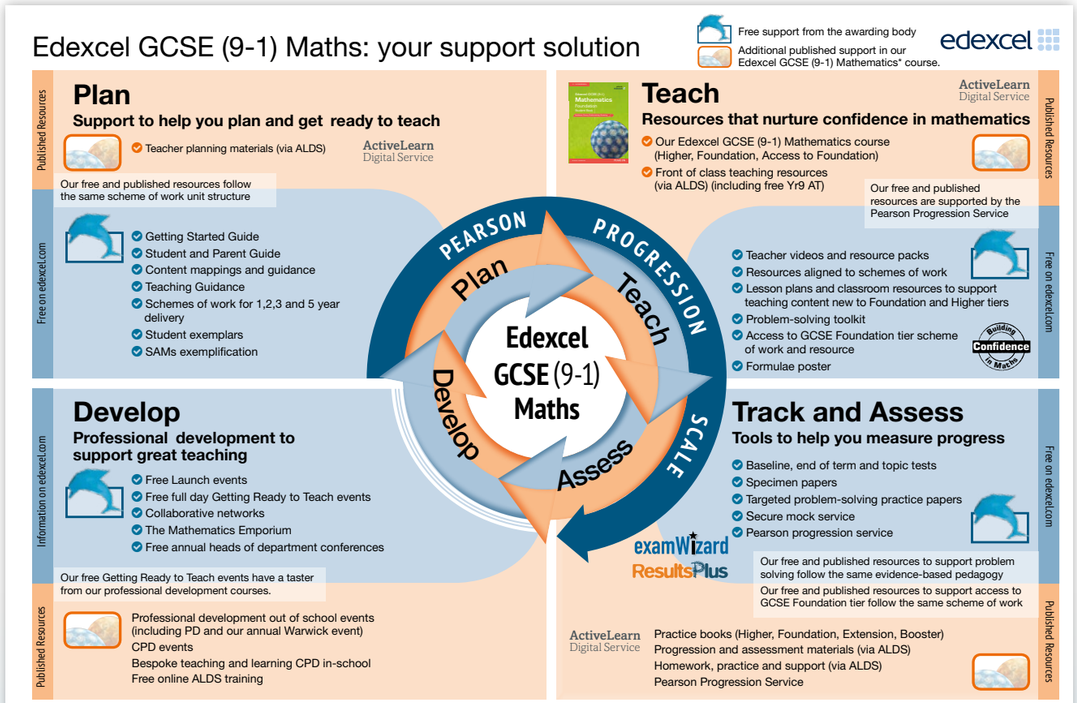
Mark scheme

Learn more and download our sample assessment material at
www.edexcel.com/gcsemathspost16

Supporting great Maths teaching

On our website, you'll find all the support you need to plan and deliver GCSE (9-1) Maths successfully.

Discover all our free support:
www.edexcel.com/gcsemathspost16



This graphic shows the support we'll provide for Edexcel GCSE (9-1) Mathematics. It includes the free support available on **www.edexcel.com/gcsemathspost16**, and our published resources on **www.pearsonschools.co.uk/gcsemathspost16**.

Our Edexcel GCSE (9-1) Mathematics course

Our brand-new resources are written specifically for the GCSE 9-1 Maths and take an innovative mastery approach to tackle the increase in demand.

- Designed to help you teach the new Edexcel GCSE in Maths specification with confidence.
- Builds fluency and nurtures confidence in Maths.
- Focuses on problem-solving and reasoning throughout.
- Support for your low attaining students with dedicated workbooks to help them master the basics.

Visit **www.pearsonschools.co.uk/edexcelgcse9-1mathscourse**

You don't have to purchase any resources to deliver this qualification.
A full list of endorsed resources is available on **www.edexcel.com/gcsemathsinfo**

The personal support of our team of experts

We hope to give you all the tools you need, but should you need further help, our team of assessment experts is always there for you, including subject expert Graham Cumming.

Mathematics Emporium

Our unique Mathematics Emporium is prized by teachers. Run by Graham Cumming, our in-house mathematics expert, it will keep you up to date and give you easy access to all the materials you need to teach GCSE Mathematics 2015 throughout the year.

You can access and download:

- Past papers
- Schemes of work
- Specifications
- Mock and practice papers
- Mark schemes
- Grade boundaries
- Examiners reports

The Mathematics Emporium is free to use to all maths teachers in UK schools – all you need to do is create an account. We keep these documents secure to stop students from freely accessing them, so that you can use our papers with your classes as mocks, tests and homework

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You can sign up to The Emporium via **www.edexcel.com/emporium**

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- New training events and support materials
- News and government announcements affecting mathematics education
- New qualifications and resources.

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