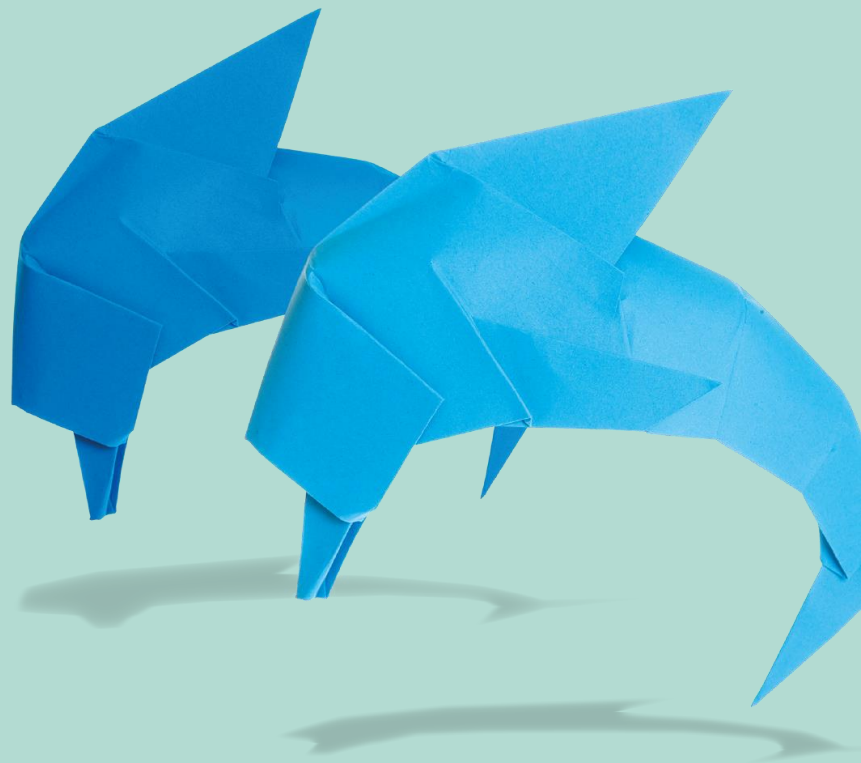


# GCSE Mathematics

Delivering GCSE Maths:  
Everything You Need to  
Know – The Basics

Christian Seager & Melanie  
Muldowney



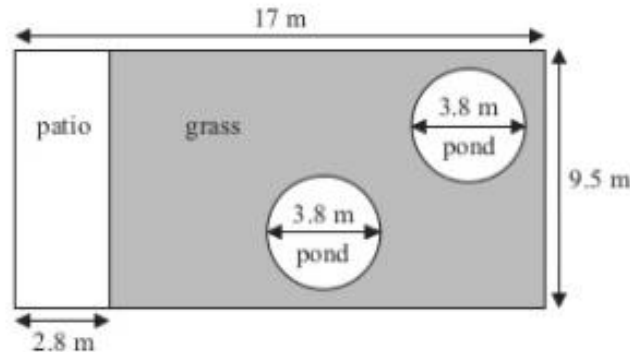
# History lesson ... 2012 – QWC Questions

\*5 Mr Weaver's garden is in the shape of a rectangle.

In the garden

there is a patio in the shape of a rectangle  
and two ponds in the shape of circles with diameter 3.8 m.


The rest of the garden is grass.



Mr Weaver is going to spread fertiliser over all the grass.  
One box of fertiliser will cover  $25 \text{ m}^2$  of grass.

How many boxes of fertiliser does Mr Weaver need?  
You must show your working.

No longer explicitly requested

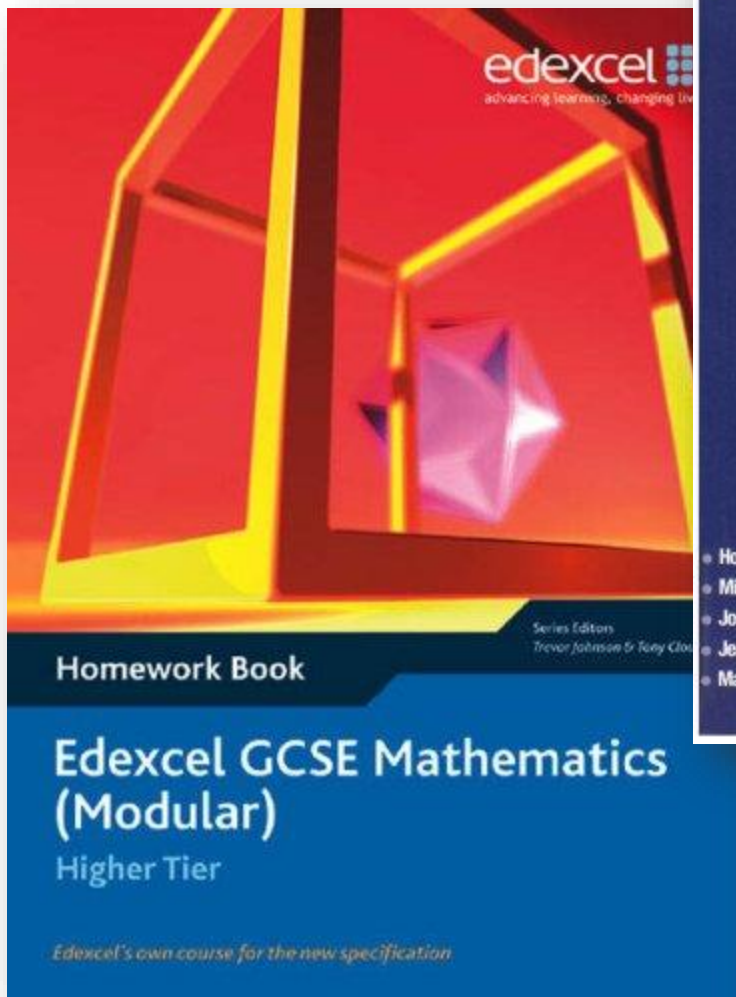


# 2012–2014

Early Entry – Sitting GCSEs before the end of year 11

March sitting – a legacy to this day in lots of schools

# Modular...



# Intermediate Papers...

Centre No.						Paper Reference					Surname	Initial(s)	
Candidate No.						5	5	2	3	/	0	3	Signature

Paper Reference(s)  
**5523/03**

**Edexcel GCSE**  
**Mathematics A – 1387**  
Paper 3 (Non-Calculator)  
**Intermediate Tier**

Tuesday 7 November 2006 – Morning  
Time: 2 hours

Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

Items included with question papers


Nil

Examiner's use only

--	--	--

Team Leader's use only

--	--	--



# Finally – Coursework...

## Data Handling Coursework

### Introduction

#### Ideas

My handling data coursework is concerning pupils at Mayfield High School.

The secondary data provided on each student is: Name, Age, Year Group, IQ, Weight, Height, Hair Colour, Eye colour, Distance from home to school, method of travel, numbers of brothers and sisters, key stage 2 results in maths, science and English.

My particular line of enquiry is about the heights and weights of boys and girls in all year groups.

#### Aims

The aim of my coursework is to observe if my hypotheses are correct and provide enough evidence to back my conclusion and interpretation in the end.

### Hypothesis

My hypotheses are,

1. My first hypothesis is regarding weight (mass): Boys weigh more than girls.

# The current exams

Please check the examination details below before entering your candidate information

Candidate surname	Other names
Pearson Edexcel Level 1/Level 2 GCSE (9-1)	Centre Number Candidate Number
Time 1 hour 30 minutes	Paper reference <b>1MA1/1F</b>
<b>Mathematics</b> <b>PAPER 1 (Non-Calculator)</b> <b>Foundation Tier</b>	
You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, Formulae Sheet (enclosed). 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.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**

**Information**

- The total mark for this paper is 80
- 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.
- Try to answer every question.
- Check your answers if you have time at the end.
- Good luck with your examination.

Turn over ►

P66306RA

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Barcode

Pearson

1MA1 = GCSE Maths

1F = Paper 1 Foundation Tier

1H = Paper 1 Higher Tier

3 × 90 min papers  
(1 × Non Calc, 2 × Calc)

80 marks each paper  
(total 240 marks)

# Dates for your diary

2024 dates:

Thursday 16/05/24

Monday 03/06/24

Mon 10/06/24

(all am)

(Don't forget there is a November sitting too for re-sit students – 8/11/23, 10/11/23, 13/11/23)



# Access arrangements/modified papers

Speak to HoD/Exam officer

Exams

## Special requirements

## Modified formats

Modified papers help ensure that candidates with varying needs can access the examination materials needed to accurately assess their skills and knowledge. There is a variety of formats available, each of which aims to accommodate a range of difficulties.

# Mark Schemes

## General marking guidance

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

- 1 All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first. Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

- 2 All the marks on the mark scheme are designed to be awarded. Examiners must mark the answer (or no answer) indicated on the answer line. No marks are awarded for any marks appropriate from the mark scheme.

**Questions where working is not required:** In questions where working is not required, full marks will be given in the mark scheme.

- 3 **Crossed out work**  
This should be marked **unless** the candidate has marked an alternative response.

- 4 **Choice of method**  
If there is a choice of methods shown, mark the method used. If no answer appears on the answer line, mark both methods.

## 7 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question or its context. (eg an incorrectly cancelled fraction when the unsimplified fraction would gain full marks). It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg. incorrect algebraic simplification).

## 8 Probability

Probability answers must be given as a fraction, percentage or decimal. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths). Incorrect notation should lose the accuracy marks, but be awarded any implied method marks. If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

## 9 Linear equations

Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

## 10 Range of answers

Unless otherwise stated, when an answer is given as a range (eg 3.5 – 4.2) then this is inclusive of the end points (eg 3.5, 4.2) and all numbers within the range.

## Number in brackets after a calculation

Where there is a number in brackets after a calculation eg  $2 \times 6 (=12)$  then the mark can be awarded **either** for the correct method, implied by the calculation **or** for the correct answer to the calculation.

## Use of inverted commas

Some numbers in the mark scheme will appear inside inverted commas eg "12"  $\times$  50 ; the number in inverted commas cannot be any number – it must come from a correct method or process but the candidate may make an arithmetic error in their working.

## Word in square brackets

Where a word is used in square brackets eg [area]  $\times$  1.5 : the value used for [area] does **not** have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

## Misread

If a candidate misreads a number from the question. eg uses 252 instead of 255; method or process marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.

## Guidance on the use of abbreviations within this mark scheme

<b>M</b>	method mark awarded for a correct method or partial method
<b>P</b>	process mark awarded for a correct process as part of a problem solving question
<b>A</b>	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
<b>C</b>	communication mark awarded for a fully correct statement(s) with no contradiction or ambiguity
<b>B</b>	unconditional accuracy mark (no method needed)
<b>oe</b>	or equivalent
<b>cao</b>	correct answer only
<b>ft</b>	follow through (when appropriate as per mark scheme)
<b>sc</b>	special case
<b>dep</b>	dependent (on a previous mark)
<b>indep</b>	independent
<b>awrt</b>	answer which rounds to
<b>isw</b>	ignore subsequent working

# Mark Schemes

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	56.4	M1	for a start to a method, eg $846 \div 15$ or $8.46 \div 0.15$ or $8.46 \div 3 \times 20$ or $282 \div 5$ that leads to 5 as the first digit  or for a complete method with no more than one arithmetic error	A start to a repeated subtraction method or a build-up method is acceptable if a correct first digit of 5 is found  An answer of $56\frac{2}{5}$ gets 3 marks
		A1	for digits 564 identified	
		A1	(ft) dep on M1 for correct placement of the decimal point into their final answer	
2	$4\frac{7}{8}$	M2	for a complete method, eg $7 - 2 + \frac{3}{8} - \frac{4}{8}$ condoning error with one numerator or for $\frac{59}{8} - \frac{5}{2} = \frac{59}{8} - \frac{20}{8} (= \frac{39}{8})$ with no more than one error <b>OR</b> for an answer of 4.875	At least one improper fraction must be correct Both decimals must be correct  Any equivalents must be a mixed number
		(M1)	for finding two fractions with a correct common denominator, with at least one correct corresponding numerator, eg $\frac{3}{8}, \frac{4}{8}$ or  for converting both to improper fractions, eg $\frac{59}{8}, \frac{5}{2}$ <b>OR</b> for $7.375 - 2.5$ )	
		A1	for $4\frac{7}{8}$ oe eg $4\frac{14}{16}$	

## Guidance on the use of abbreviations within this mark scheme

<b>M</b>	method mark awarded for a correct method or partial method
<b>P</b>	process mark awarded for a correct process as part of a problem solving question
<b>A</b>	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
<b>C</b>	communication mark awarded for a fully correct statement(s) with no contradiction or ambiguity
<b>B</b>	unconditional accuracy mark (no method needed)
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<b>ft</b>	follow through (when appropriate as per mark scheme)
<b>sc</b>	special case
<b>dep</b>	dependent (on a previous mark)
<b>indep</b>	independent
<b>awrt</b>	answer which rounds to
<b>isw</b>	ignore subsequent working

Become an examiner?

# Grade Boundaries

June 2023

1MA1			9	8	7	6	5	4	3	2	1
1F	Foundation tier	Paper 1F					61	50	37	24	11
2F	Foundation tier	Paper 2F					61	49	36	23	11
3F	Foundation tier	Paper 3F					60	48	35	23	11
1H	Higher tier	Paper 1H	67	57	48	36	25	14	8		
2H	Higher tier	Paper 2H	68	58	48	37	26	16	11		
3H	Higher tier	Paper 3H	68	58	49	38	27	17	12		

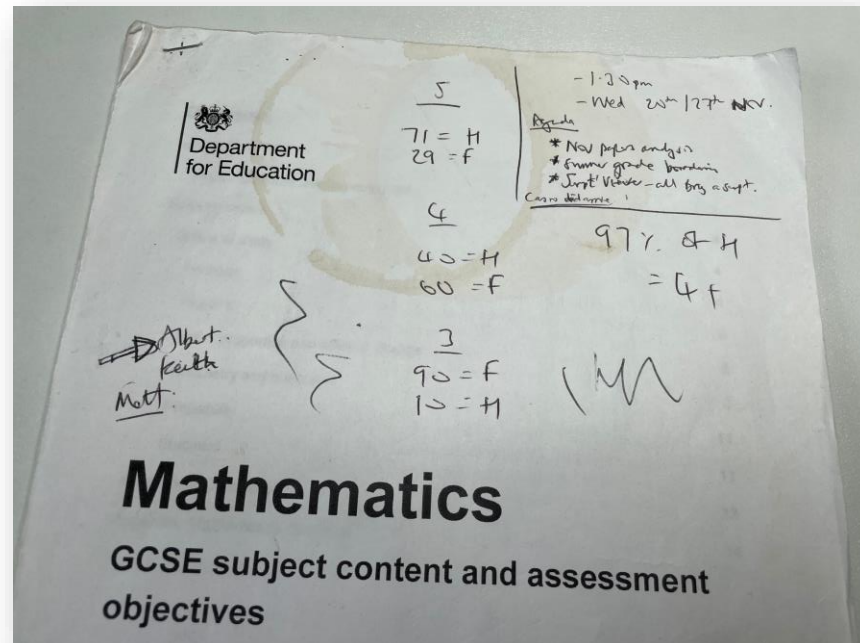
(Marks for papers 1F, 2F, 3F, 1H, 2H and 3H are each out of 80.)

1MA1 overall		9	8	7	6	5	4	3	2	1
1MA1F	Foundation tier					182	147	109	71	33
1MA1H	Higher tier	203	174	145	112	79	47	31		

These change EVERY sitting!

The content for all boards:

# DfE Subject Content and Assessment Objectives



# The content for all boards:

Content is indicated that is for all students (standard font), for the overlap between Foundation and Higher tier (underlined font) and for Higher tier only (**bold font**).

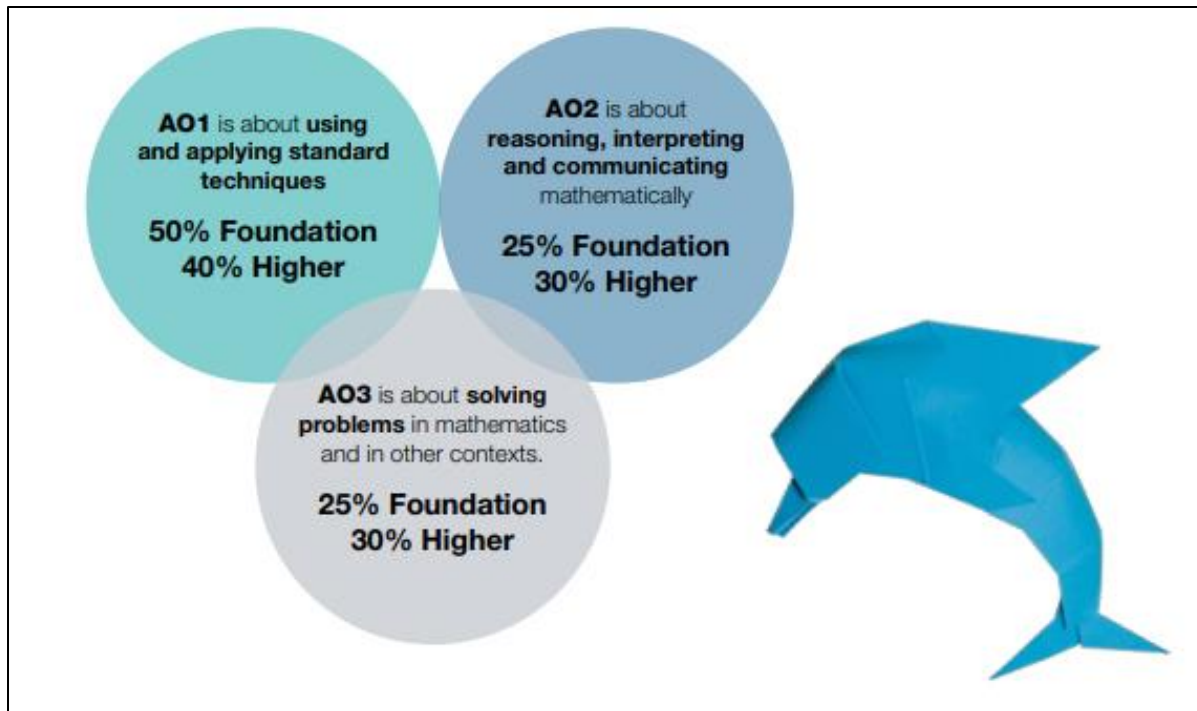
- maps and scale drawings and use of bearings
16. know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders)
17. know the formulae: circumference of a circle  $= 2\pi r = \pi d$ , area of a circle  $= \pi r^2$ ; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes; surface area and volume of spheres, pyramids, cones and composite solids
18. calculate arc lengths, angles and areas of sectors of circles
19. apply the concepts of congruence and similarity, including the relationships between lengths areas and volumes in similar figures
20. know the formulae for: Pythagoras' theorem,  $a^2 + b^2 = c^2$ , and the trigonometric ratios,  $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$ ,  $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$  and  $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$ ; apply them to find angles and lengths in right-angled triangles and, where possible, general triangles in two and three dimensional figures
21. know the exact values of  $\sin \theta$  and  $\cos \theta$  for  $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$  and  $90^\circ$ ; know the exact value of  $\tan \theta$  for  $\theta = 0^\circ, 30^\circ, 45^\circ$  and  $60^\circ$
22. know and apply the sine rule,  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ , and cosine rule,

# Six content areas

	F	H
• Number	25%	15%
• Algebra	20%	30%
• Ratio, proportion, rates of change	25%	20%
• Geometry	15%	20%
• Probability & Statistics	15%	15%

# Content and Assessment Objectives

The subject content and assessment objectives for our exams are drawn from the GCSE subject content written by the DfE.



More emphasis on problem-solving, communication, proof, interpretation



# There are differences between boards ...

Pearson Edexcel does have:

Stem & Leaf  
Frequency Polygons  
Venn diagram notation ( $\cup$  and  $\cap$ )  
Function notation  
Iteration

\* There are some other minor variations.

## Differences between Pearson Edexcel and AQA GCSE



Below is a summary of the content differences between our qualification at Pearson Edexcel and AQA GCSE 9-1 Mathematics. Included as an appendix are example questions and further specification details.

**Additional Content** This content is included in our Mathematics GCSE, you may need to update your schemes of learning to include these.

### Stem & Leaf Diagrams

Students are expected to be able to draw and extract information, such as the median, from stem and leaf diagrams on both Higher and Foundation Tier. When drawing stem and leaf diagrams, it is expected that they will be "ordered" stem and leaf diagrams (this requirement may not be explicitly mentioned in the exam question).

### Frequency Polygons

Students are expected to be able to draw and extract information from frequency polygons on both Higher and Foundation Tier.

### Capture - Recapture

The Peterson capture - recapture method is expected at Higher Tier.

## Differences between Pearson Edexcel and OCR GCSE



Below is a summary of the content differences between our qualification at Pearson Edexcel and OCR GCSE 9-1 Mathematics. Included as an appendix are example questions and further specification details.

**Additional Content** This content is included in our Mathematics GCSE, you may need to update your schemes of learning to include these.

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### Frequency Polygons

Students are expected to be able to draw and extract information from frequency polygons on both Higher and Foundation Tier.

### Capture - Recapture

The Peterson capture - recapture method is expected at Higher Tier.

**Variation in Content** Below shows topics where the content may include additional items or variations.

### Venn Diagrams

Students are expected to use the formal notation for unions and intersections and in conjunction with probability e.g.  $P(A \cup B)$  on both Foundation and Higher Tier.

### Functions

Students are expected to use the formal notation for functions, inverse functions and composite functions, e.g.  $f(x)$ ,  $gf(x)$  on Higher Tier.

### Iteration

To find approximate solutions to equations numerically students will be expected to use iteration formulae on Higher Tier. OCR considers iteration at GCSE to be using systematic sign-change methods (trial and improvement). We use sign-change to indicate that a solution lies between two values, but questions can include iteration formulae.

### Trigonometry

Students are expected to know about the ambiguous case when using the sine rule on Higher Tier.

Additional items or variations.

"Weak" or "Strong" is required.

Differences of two square at Higher Tier.

No instruction to do so students are not penalised for not simplifying

# Comparison Documents Available v AQA (v OCR available too)

## Differences between Pearson Edexcel and AQA GCSE

The below is a summary of the content differences between Pearson Edexcel and AQA GCSE 9-1 Mathematics.

Included as an appendix are example questions and further specification details.

**Additional Content.** The below content is included in the Pearson Edexcel Mathematics GCSE and you may need to update your schemes of learning to include these.

### Stem & Leaf Diagrams

Students are expected to be able to draw and extract information, such as the median, from stem and leaf diagrams on both Higher and Foundation Tier. When drawing stem and leaf diagrams, it is expected that they will be "ordered" stem and leaf diagrams (this requirement may not be explicitly mentioned in the exam question).

### Frequency Polygons

Students are expected to be able to draw and extract information from frequency polygons on both Higher and Foundation Tier.

### Capture – Recapture

The Peterson capture-recapture method is expected at Higher Tier

**Variation in Content.** The below shows topics where the content may include additional items or variations

### Scatter Graphs

Correlation only needs to be described as positive or negative. No further elaboration i.e. "Weak" or "Strong" is required.

### Compass Point Bearings

Students are expected to have knowledge of four (not eight) compass point bearings.

### Rationalising the Denominator.

Students could be asked to rationalise the denominator of a fraction which involves differences of two square at Higher Tier.

### **General notes.**

#### Answers in their Simplest Form

Exam questions include instructions where the simplest form is required. Where there is no instruction to do so students are not penalised for not simplifying their answers.

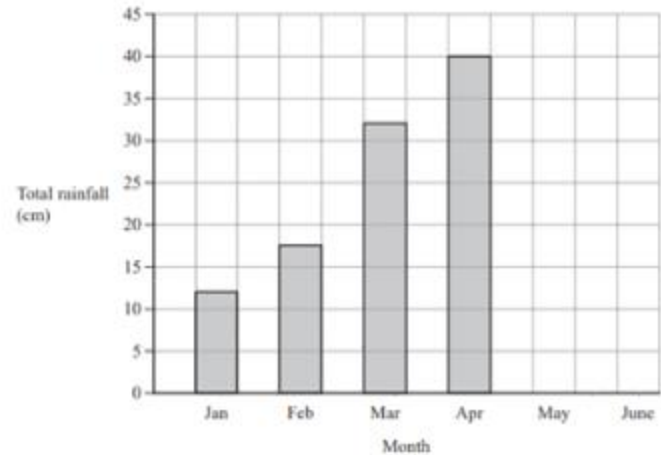
# Little things to remember...

- 7 Simon buys some candles.  
Each candle costs £2
- Simon pays with a £20 note.  
He gets £6 change.
- Work out the number of candles Simon buys.

(Total for Question 7 is 3 marks)

Working space and lines (they are provided when an extended sentence is required).

- 8 The bar chart shows information about the total rainfall each month for four months in a city.



In May, the total rainfall was 35 cm.  
In June, the total rainfall was 20 cm.

- (a) Use this information to complete the bar chart.

(2)

Rupa says,

"In February there was 15.5 cm of rainfall because the bar is half a square above 15"

- (b) Explain why Rupa is incorrect.

(1)

(Total for Question 8 is 3 marks)

14 The box below contains three mathematical symbols.

= < >

Here are three symbols.

From the box, choose a symbol to make each o

(i)  $\frac{5}{8}$  .....  $\frac{2}{8}$

< > =

Write one of these symbols in each box to make four true statements.

14  21

$4 + 7$    $103 - 92$

$2^2$    $2 \times 2$

$-3$    $-5$

(Total for Question 10 is 2 marks)

Multiple choice?

# Foundation start ...

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write 1476 to the nearest 10

(Total for Question 1 is 1 mark)

2 Write a fraction in the box to make the calculation correct.

$$1 - \frac{3}{10} =$$

(Total for Question 2 is 1 mark)

3 Here is a list of numbers.

3   3   3   3   4   4   5   7   8

Write down the mode of the numbers.

(Total for Question 3 is 1 mark)

4 Write down a 3 digit number that is a multiple of 5

(Total for Question 4 is 1 mark)

- Recognisable start
- The first five are all one mark AO1 questions
- The papers are ramped in difficulty

8 Solve the simultaneous equations

$$5x + 2y = 27$$

$$6x + 4y = 28$$

# ... Foundation end

# Higher start ...

- Starts with the crossover questions
- The papers are ramped in difficulty
- Questions at the end of the paper are designed to differentiate between the highest grades

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

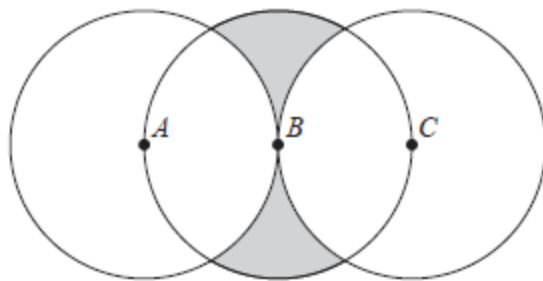
1 Solve  $7x - 27 < 8$

(Total for Question 1 is 2 marks)

2 Write 124 as a product of its prime factors.

21 The diagram shows three circles, each of radius 4 cm.

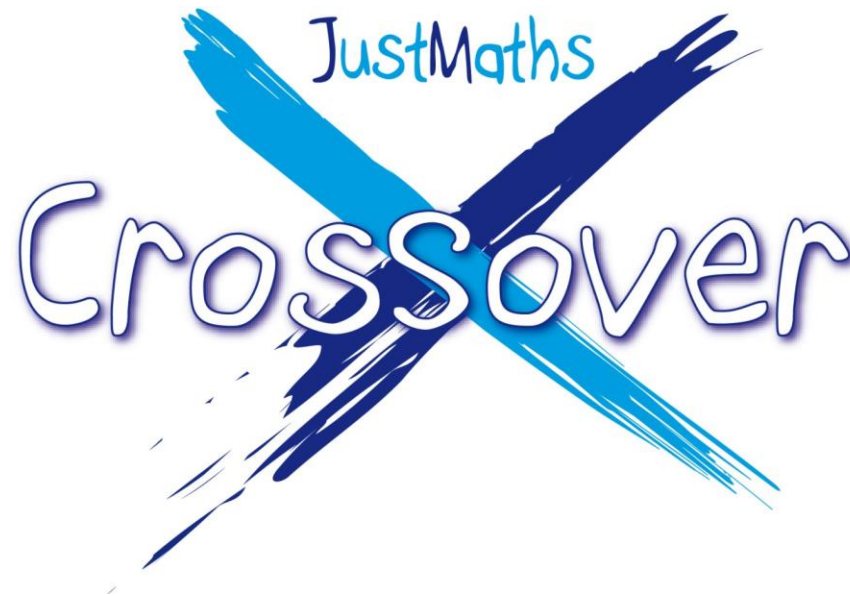
The centres of the circles are  $A$ ,  $B$  and  $C$  such that  $ABC$  is a straight line and  $AB = BC = 4$  cm.



Work out the total area of the two shaded regions.  
Give your answer in terms of  $\pi$

# ... Higher end

# The overlap between H and F



# Worth knowing ... Frequency Analysis

Foundation Tier (to Nov 2020 – no Jun 2020 sitting)

5+ appearances	3 and 4 appearances	Topics with > 3 marks per appearance
Simplifying expressions 14	Decimals to fractions 4	Plans and elevations 6.000
Powers & Roots 11	Decimals to percentages 4	Percentages & ratio 5.000
Rounding 11	Percentages to fractions 4	Ratio & percentages 5.000
Standard form 11	Combinations / Listing outcomes 4	Circles - circumference 5.000
Ratio 11	Exchange rates 4	Surface area and volume 5.000
Proportional Reasoning 10	Coordinates 4	Volume of a prism 5.000
Solving linear equations 10	Factorising expressions 4	FDP / Ratio 4.667
Probability 10	Forming and solving equations 4	Area in context 4.667
Money problem solving 9	Rearranging equations 4	Surface area 4.500
Substitution 9	Inequalities 4	Quadratic graphs 4.333
Angle facts 9	Simultaneous equations 4	Venn diagrams 4.200
Place value 8	nth term of a sequence 4	% / Fractions & ratio 4.000
Fraction of an amount 8	Similarity 4	Percentages 4.000
Sequences 8	Time 4	Compound interest 4.000
Speed / Distance / Time 8	Perimeter 4	Ratio & trigonometry 4.000
Index laws 7	Circle definitions 4	Area / Percentages 4.000
Scale Drawing / Using Scale 7	Angles in polygons 4	Pythagoras theorem 4.000
Factors 6	Estimate of the mean / Mean from a table 4	Probability and ratio 4.000
Order of (and four) operations 6	Pie charts 4	Angles in polygons 3.750
Percentage of an amount 6	Bar charts 4	Scale Drawing / Using Scale 3.714
Proportion - recipes 6	Relative frequency 4	Money problem solving 3.667
Straight line graphs 6	Probability Scale 4	Frequency trees 3.667
Pictograms 6	Vectors 4	Probability from a table 3.667
Use of calculator 5	Numbers in size order 3	Best value 3.500
Fractions 5	Multiples 3	Exchange rates 3.500
Function machines 5	Lowest Common Multiples 3	Forming and solving equations 3.500
Solving equations 5	Prime numbers 3	Arcs and sectors 3.500
Metric measures 5	Fraction equivalence 3	Volume 3.500
Reflections 5	Fractions - multiplication 3	Angles in a triangle 3.500
Venn diagrams 5	FDP / Ratio 3	Two way tables 3.500
	Percentage profit 3	Percentage profit 3.333
	Estimation 3	Stem & leaf diagrams 3.333
	Error intervals 3	Probability tree diagrams 3.333
	Conversion graphs 3	
	Expand single brackets 3	
	Forming expressions 3	
	Quadratic graphs 3	
	Time tables 3	
	Metric conversions 3	
	Area in context 3	
	Averages 3	
	Scatter graphs 3	
	Stem & leaf diagrams 3	
	Frequency trees 3	
	Probability from a table 3	
	Probability tree diagrams 3	

Higher Tier (to Nov 2020 - no Jun 2020 sitting)

appearances	3 and 4 appearances	Topics with > 4 marks per appearance
14	Lowest Common Multiples 4	Percentage of an amount 5.000
11	Upper & Lower bounds 4	Ratio in context 5.000
11	Error intervals 4	Forming expressions 5.000
11	Simplifying expressions 4	Bearings 5.000
11	Expanding triple brackets 4	Scale Drawing / Using Scale 5.000
10	Factorising expressions 4	Area in context 5.000
10	Quadratic graphs 4	Surface area and volume 5.000
9	Quadratic inequalities 4	Further trigonometry 5.000
8	Gradient of a curve 4	Upper & Lower bounds 4.750
7	Area under a curve 4	Quadratic graphs 4.750
6	Iteration 4	Venn diagrams 4.750
6	Algebraic proof 4	Volume 4.667
6	Arcs and sectors 4	Arcs and sectors 4.500
6	Combinations of transformations 4	Surface area 4.500
6	Averages 4	Angle facts 4.500
6	Histograms 4	Conditional probability 4.400
5	Venn diagrams 4	Coordinate geometry 4.333
5	Use of calculator 3	Angles in polygons 4.333
5	Powers & Roots 3	Cones and spheres 4.167
5	Recurring decimals 3	Vectors 4.167
5	Fractions - multiplication 3	
5	Proportional Reasoning 3	
5	Solving Quadratic equations 3	
5	Transforming functions 3	
5	Equation of a circle / Sim equations 3	
5	Solving equations 3	
	Quadratic sequences 3	
	Congruence 3	
	Volume 3	
	Pythagoras theorem 3	
	Trigonometry 3	
	3d Trigonometry 3	
	Angles in polygons 3	
	Enlargements 3	
	Density / Mass / Volume 3	
	Scatter graphs 3	
	Frequency polygons 3	
	Relative frequency 3	
	Probability 3	

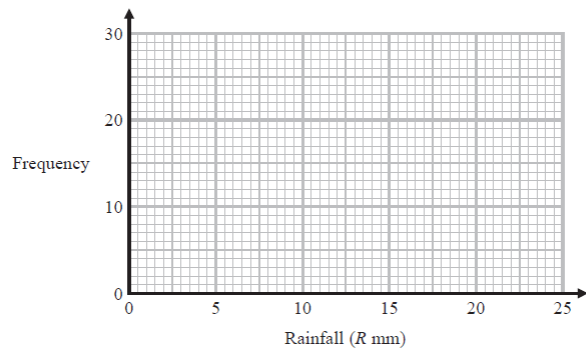


# 2023 Summer 1H/F...

23 The table shows information about the daily rainfall in a town for 60 days.

Rainfall ( $R$ mm)	Frequency
$0 \leq R < 5$	8
$5 \leq R < 10$	24
$10 \leq R < 15$	13
$15 \leq R < 20$	11
$20 \leq R < 25$	4

Draw a frequency polygon for this information.



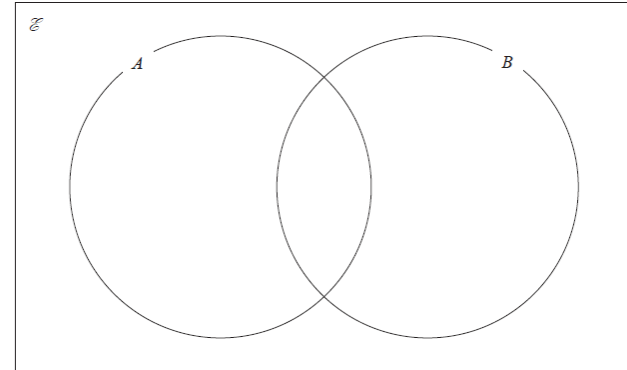
(Total for Question 23 is 2 marks)

24  $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{\text{odd numbers}\}$

$B = \{\text{square numbers}\}$

(a) Complete the Venn diagram for this information.



(3)

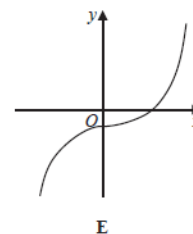
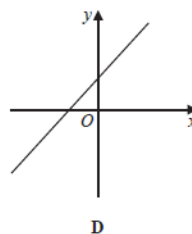
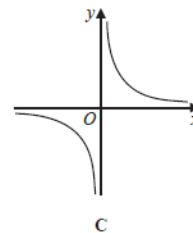
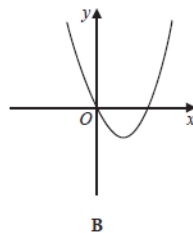
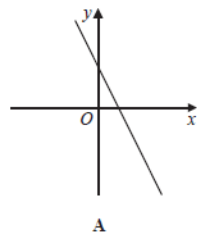
A number is chosen at random from the universal set  $\mathcal{E}$

(b) Find the probability that this number is in the set  $B'$

(2)

# 2F...

28 Here are five graphs.



The table shows the equations of these graphs.

Equation	Graph
$y = x^2 - 4x$	
$y = x + 3$	
$y = x^3 - 2$	
$y = \frac{1}{x}$	
$y = 5 - 2x$	

Match the letter of each graph with its equation.

(Total for Question 28 is 3 marks)

# 3F/H...

**23** It takes 14 hours for 5 identical pumps to fill a water tank.

How many hours would it take 4 of these pumps to fill another water tank of the same size?

..... hours

(Total for Question 23 is 2 marks)

## How would you teach this?

# Top end

24 There is a total of  $y$  counters in a box.

There are  $x$  pink counters and 5 blue counters in the box.  
The rest of the counters are green.

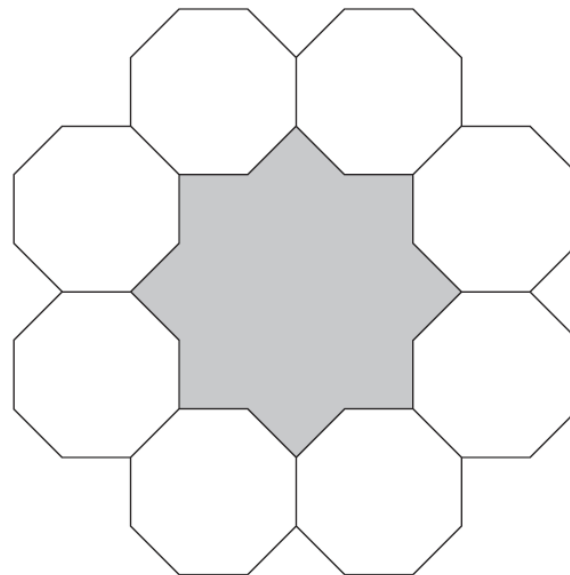
$$x:y = 1:3$$

Freda takes at random two counters from the box.

Find, in terms of  $x$ , an expression for the probability that Freda takes two counters of the same colour.

Give your answer as a fraction in the form  $\frac{ax^2 + bx + c}{dx^2 + ex}$  where  $a$ ,  $b$ ,  $c$ ,  $d$  and  $e$  are integers.

24 The diagram shows 8 identical regular octagons joined to enclose a shaded shape.



Each octagon has sides of length  $a$ .

Find, in terms of  $a$ , an expression for the area of the shaded shape.

Give your answer in the form  $p(2 + \sqrt{2})a^2$  where  $p$  is an integer.  
You must show all your working.

## Top end

**22** There are only blue pens and red pens in a box.

The number of blue pens is four times the number of red pens.

Rita takes at random one pen from the box.

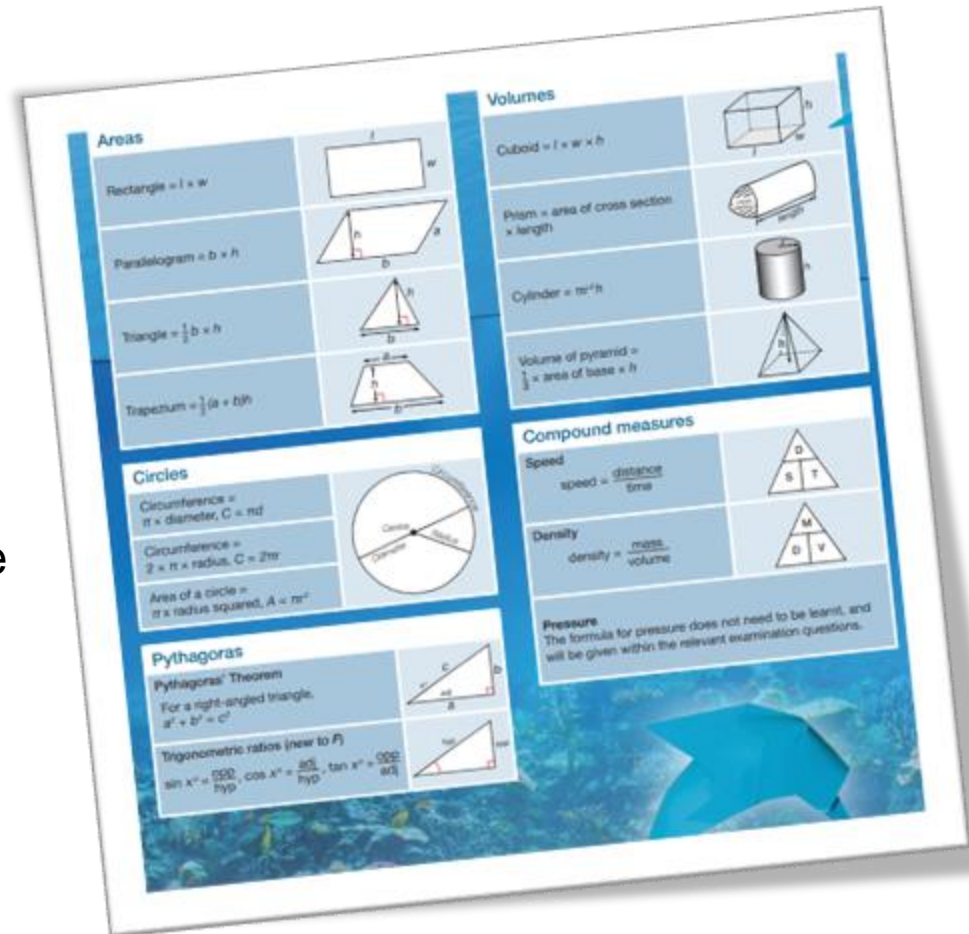
She records the colour of the pen and then replaces it in the box.

Rita does this  $n$  times, where  $n \geq 2$

Write down an expression, in terms of  $n$ , for the probability that Rita gets a blue pen at least once and a red pen at least once.

# Remembering Formula

- Students need to remember most formulas they will be required to use in their exams
- Some will be given within the question e.g. volume of a cone
- Free [formula posters](#) for classrooms available for all centres



# Accessibility

In 2018 we made changes to our GCSE examinations, we are continually monitoring the examination experience and outcomes for our students to ensure their full potential can always be met.

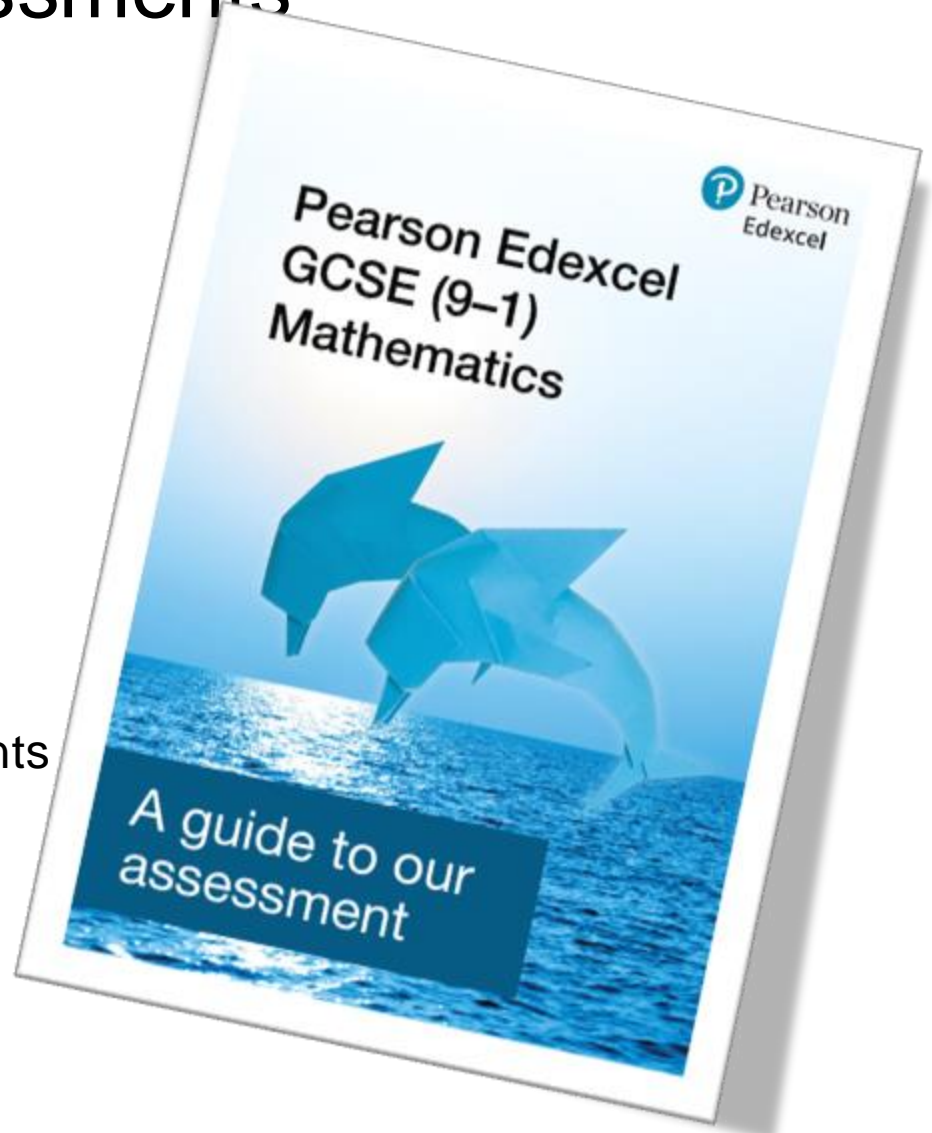
- The early questions on Foundation tier papers are accessible to all students and mainly comprise of one-mark questions (First five).
- The common questions which appear on both Higher and Foundation tier papers are fully accessible to students targeting grades 4 and 5.
- Appropriate language and contexts are used on all questions so that we are only testing mathematical ability.
- There is a good coverage of topics tested, including those which are new to the curriculum.
- The diagrams are large enough and students have enough working space.

# A guide to our assessments

We've produced a comprehensive guide to our assessments.

The content of the guide is relevant whether you are new to teaching GCSE or switching from another exam board.

To learn more about our assessments and the key features of them, download the guide [here](#).







# Contact or arrange a visit

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Pearson