edexcel

INTERNATIONAL GCSE

Mathematics (Specification B) (9-1)

GETTING STARTED GUIDE

Pearson Edexcel International GCSE in Mathematics (Specification B) (4MB1)

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First examination June 2018

Pearson

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Introduction

This Getting Started guide provides an overview of the new International GCSE Mathematics B qualification, to help you get to grips with the changes to content and assessment, and to help you understand what these mean for you and your students.

Support for delivering the new specification

Our package of support to help you plan and implement the new specification includes:

Planning – In addition to the relevant section in this guide, we will provide a course planner and an editable Scheme of Work that you can adapt to suit your department.

Teaching and learning – To support you in delivering the new specification, we will provide suggested resource lists and suggested activities.

Understanding the standard –Sample assessment materials will be provided.

Tracking learner progress – Results Plus provides the most detailed analysis available of your students' exam performance. It can help you identify topics and skills where students could benefit from further learning. We will also offer examWizard, which is a free exam preparation tool containing a bank of past Edexcel exam questions, mark schemes and examiners' reports for a range of GCSE and GCE subjects.

Support – Our subject advisor service, and online community, will ensure you receive help and guidance from us as well as enabling you to share ideas and information with each other. You can sign up to receive e-newsletters to keep up to date with qualification updates, and product and service news. Email our subject advisor: TeachingMaths@pearson.com

Key features of the qualification

- The content is very similar to the previous 4MB0 specification but has been updated to ensure progression to IAL and GCE A Level, as well as remain comparable to the Ofqual regulated GCSE.
- The assessment model has a 1.5 hour paper (Paper 1) with shorter questions that provides accessibility for all and ensures a good topic coverage, whereas the longer 2.5 hour paper (Paper 2) explores 10 or 11 topics in more depth and is a useful preparation for the extended problems met at A Level. Both papers use a calculator.
- Students develop problem-solving skills by translating problems in mathematical or non-mathematical contexts and develop reasoning skills through exercises such as presenting arguments and proofs, and making deductions and drawing conclusions from mathematical information.
- We have designed our International GCSE qualification to be of equivalent standard to Pearson's regulated GCSE qualification. This ensures that International GCSEs are recognised globally and provide students with the same progression routes.

A Getting started for teachers

Qualification overview

This section provides an overview of the course to help you see what you will need to teach. The overview gives a general summary of each of the examined papers.

Paper 1	
■ Externally assessed ■ Availability: January and June ■ First assessment: June 2018	Paper is 33 1/3 ($33\frac{1}{3}$) % of the total International GCSCE
Content summary ■ Number and algebra ■ Geometry and trigonometry ■ Statistics and probability	
Assessment ■ This paper is assessed through a 1-hour and 30-minute examination set and marked by Pearson. ■ The total number of marks for each paper is 100. ■ The paper will consist of around 26-30 questions with varying mark allocations per question, which will be stated on the paper. ■ The paper will contain questions from any part of the specification content, and the solution of any questions may require knowledge of more than one section of the specification content. ■ The paper will have approximately 40% of the marks distributed evenly over grades 4 and 5 and approximately 60% of the marks distributed evenly over grades 6, 7, 8 and 9. ■ A calculator may be used in the examination.	

Paper 2	
■ Externally assessed ■ Availability: January and June ■ First assessment: June 2018	Paper is 66 2/3 ($66\frac{2}{3}$) % of the total International GCSCE
Content summary ■ Number and algebra ■ Geometry and trigonometry ■ Statistics and probability	
Assessment ■ This paper is assessed through a 2-hour and 30-minute examination set and marked by Pearson. ■ The total number of marks for each paper is 100. ■ The paper will consist of around 11-12 questions with varying mark allocations per question, which will be stated on the paper. ■ The paper will contain questions from any part of the specification content, and the solution of any questions may require knowledge of more than one section of the specification content. ■ The paper will have approximately 40% of the marks distributed evenly over grades 4 and 5 and approximately 60% of the marks distributed evenly over grades 6, 7, 8 and 9. ■ Where a question on Paper 2 requires the use of a formula from the formulae sheet, the formula will be given at the end of the question. ■ A calculator may be used in the examination.	

Assessment Objectives

		% in International GCSE
AO1	Demonstrate knowledge, understanding and skills in number and algebra: ■ numbers and the numbering system ■ calculations ■ solving numerical problems ■ equations, formulae and identities ■ sequences, functions and graphs ■ matrices.	57–63%
AO2	Demonstrate knowledge, understanding and skills in shape, space and measures: ■ geometry and trigonometry ■ vectors and transformation geometry.	22–33%
AO3	Demonstrate knowledge, understanding and skills in handling data: ■ statistics ■ probability.	7–13%
	TOTAL	**100%**

What's changed from 4MB0?

The major change is that the grading will now run from grade 4 up to grade 9 (with 3 allowed) to ensure comparability with the regulated GCSE. Grade 4 is roughly equivalent to the old grade C, whereas grade 9 represents a higher level of achievement than the old A* grade, and will only be achieved by the very highest performing candidates.

Teachers wanted few other changes and so we have retained the previous assessment pattern and content but added a few extra topics to enable differentiation at the top grades.

The same principle will operate with regards to the formulae sheet: no formulae will be given in Paper 1 but some formulae will be provided in the question for Paper 2. The list of formulae that will be provided in Paper 2 has changed slightly with the removal of formulae for the circumference and area of a circle. This is line with changes in GCSE and the International GCSE Mathematics A specification.

Other changes in content are as follows:

1 Number

1E Rationalising the denominator

Surds – we now expect candidates to be able to rationalise the denominator for expressions such as $\frac{20}{\sqrt{14}-3}$ as well as those with a denominator that is a pure surd.

1 G Weights, measures and money

We have clarified the section on calculations to specifically include "average speed".

1 J Solving problems using upper and lower bounds

There is a new section on solving problems using upper and lower bounds where values are given to a degree of accuracy. For example, if $x = 15.3$ (to 1 dp) and $y = 28$ (to the nearest integer) calculate the lower bound of $\frac{x}{y}$

(See SAMs Paper 1 Question 8)

2 Sets

There are no changes in this section.

3 Algebra

3 D Use of the factor theorem

We have clarified the work on the use of the factor theorem and factorising algebraic expressions to explicitly include "algebraic division of a cubic by a linear factor" with factors of the form $(ax \pm b)$.

(See SAMs Paper 1 Question 26)

3 G Solution of equations of 1st, 2nd and 3rd degree

Linked to the above we have extended the solution of equations to include cubics as well. So questions of the following form could be asked.

(a) Show that $(2x - 1)$ is a factor of $4x^3 + 16x^2 + 9x - 9$

(b) Solve $4x^3 + 16x^2 + 9x - 9 = 0$

3 I Solve simultaneous equations...one being linear and the other quadratic

The work on simultaneous equations has been extended to include the case where one equation is linear and the other is quadratic. This brings the specification in line with the Mathematics A specification.

(See SAMs Paper 2 Question 5)

3 K Solve quadratic inequalities...

The work on inequalities has been extended to include quadratic inequalities in one unknown. This of course links in with the material on sketching quadratic curves, which was on the old 4MB0 specification.

(See SAMs Paper 1 Question 27)

4 Functions

4 G Variation, direct and indirect proportion

We have clarified the work on direct and indirect proportion by restricting the functions to x, x^2, x^3 and $\sqrt{x}$ and their reciprocals.

(See SAMs Paper 1 Question 19)

4 I Recognise that equations of the form y = mx + c are straight line graphs with gradient m and and y–intercept (0, c)

We have added a section about recognising that equations of the form y = *mx* + *c* are straight line graphs with gradient m and y intercept (0, c). Many teachers would already expect their students to know this but we have now made it an explicit requirement.

(See SAMs Paper 1 Question 13)

4 M Determination of ... stationary points and turning points

We have also added "turning points" to the section about determining maxima, minima and stationary points. Again this is a phrase many teachers will have used but it is now one which can appear in examination questions.

(See SAMs Paper 2 Question 4)

5 Matrices

5 F Transformations of the plane associated with 2 × 2 matrices

We have tidied up the notes here so that the transformations referred to are linear transformations that can be represented by 2 × 2 matrices and the other, more general transformations have been moved to Section 8.

(See SAMs Paper 2 Question 10)

5 G Combinations of transformations

There is a new note clarifying the interpretation of the matrix **AB** as a combination of transformations.

6 Geometry

6 B Geometrical reasoning

There is a new line called "Geometrical reasoning" designed to clarify that we shall continue to sometimes ask candidates to "give reasons" when using geometrical facts, e.g. "corresponding angles" or "the alternate segment theorem" .

6 H Prove the similarity of two triangles

6 J Understand and use SSS, SAS, ASA and RHS...

There is a new heading "Prove the similarity of two triangles" and another that requires candidates to "Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles." We already had a heading about congruent shapes but this section will mean we can ask for more formal proofs about congruent triangles.

(See SAMs Paper 1 Question 17 for an example using these ideas)

6 L Properties of a cyclic quadrilateral

We have also added a heading "Properties of a cyclic quadrilateral" to clarify that a knowledge of cyclic quadrilaterals and their properties is included.

7 Mensuration

7 C Mensuration of three-dimensional shapes...

There is no new content here but we have amended the notes to clarify that 3D shapes formed from say a cone and a cylinder are included.

8 Vectors and transformation geometry

Although the heading has been changed to include transformation geometry there is hardly any alteration in the content.

8 B Understand and use vector notation

We have added "position vectors" as a term we may use.

(See SAMs Paper 1 Question 7)

8 L Multiplication of a vector by a matrix

We have added a section to the notes about using the effects of a transformation on the vectors $\begin{pmatrix}1\\0\end{pmatrix}$ and $\begin{pmatrix}0\\1\end{pmatrix}$ to find the matrix representation of this transformation.

8 J Transformations of the plane

The only other changes involve the listing of transformations of the plane that cannot be represented by a 2 × 2 matrix but were expected in the 4MB0 specification, e.g. reflections in any line, translations .

(See SAMs Paper 2 Question 10)

9 Trigonometry

There are no changes to this section.

10 Statistics and probability

There are a few minor alterations of the wording here to clarify some of the terms and the coverage we expect.

10 A Graphical representation of numerical data

We now refer to bar charts and pie charts rather than "bar diagrams" and "circular diagrams".

10 D Determination of modal class...for grouped data

For grouped data we have clarified that we would expect candidates to determine the class containing the median. They are not expected to estimate the median using interpolation.

10 I Using simple conditional probability for combined events

10 F Finding very simple conditional probabilities

We have changed the section on conditional probability so that it is clear that candidates are expected to use simple conditional probabilities and also find them.

(See SAMs Paper 1 Question 9 and Paper 2 Question 9)

10 K Understand and use the term 'expected frequency'.

Finally, we have added a heading "Understand and use the term expected frequency" to clarify that we might, for example, ask how many times we would expect to get a six if a fair die is rolled 150 times.

(See SAMs Paper 1 Question 14)

Understanding problem solving and mathematical reasoning

Students need to be able to demonstrate **problem-solving skills** by translating problems in mathematical or non-mathematical contexts into a process or a series of mathematical processes.

Students need to be able to demonstrate **reasoning skills** by:

- making deductions and drawing conclusions from mathematical information
- constructing chains of reasoning
- presenting arguments and proofs
- interpreting and communicating information accurately.

Questions requiring the use of problem solving and mathematical reasoning are not new to the International GCSE specification. Papers from the previous specification (4MB0), along with papers from the other International GCSE specification (4MA0) and even the GCSE specifications 1MA0 (linear) and 2MB0 (modular), will be a good source of both of these types of question.

Examples of questions requiring problem-solving skills from 4MB0

Many of the longer questions on Paper 2 give examples of problem solving. A few examples are given below.

4MB0/01 June 2015 Q 28

This question requires students to translate a problem in a mathematical context into a series of mathematical processes.

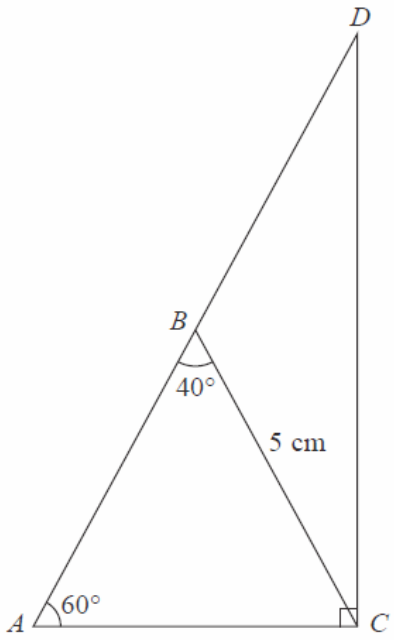


Diagram **NOT** accurately drawn

The diagram shows ΔABC in which $BC = 5$cm, $\angle BAC = 60°$ and $\angle ABC = 40°$

(a) Calculate the length, in cm to 3 significant figures, of AC

(3)

The point D is such that ABD is a straight line and DC is perpendicular to AC.

(b) Calculate the area, in cm^2 to 3 significant figures, of ΔBCD

(4)

4MB0/02 June 2015 Q 6

This question requires students to translate a problem in a non-mathematical context into a series of mathematical processes.

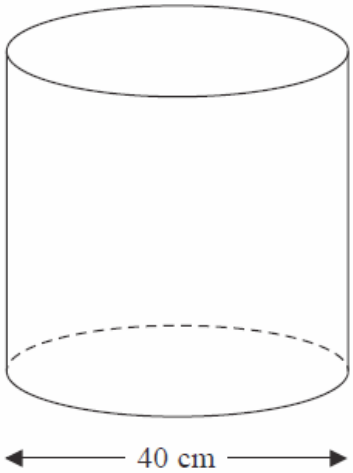


Diagram **NOT** accurately drawn

Figure 2

Figure 2 shows a cylindrical can, of diameter 40 cm, open at its top. Water is poured into the can until the depth of the water in the can is 10 cm.

(a) Calculate as a multiple of π, the volume in cm^3, of the water in the can.

(2)

30 solid glass spheres, each of radius r cm, are placed in the can. The water completely covers all the spheres and no water overflows from the can.

The depth of the water in the can is now 16.4 cm.

(b) Find the exact value of r.

Examples of questions requiring reasoning skills from 4MB0

4MB0/01 June 2015 Q 26 (especially part (b))

Questions involving reasoning are often flagged up by phrases such as "show that" as this example shows:

The **circumference** of a circle is 12 cm.

A sector of this circle has an angle of 72° at the centre of the circle.

The area of this sector is A cm^2

(a) Find an expression for A in terms of π

Simplify your expression.

The perimeter of the sector is P cm.

(b) Show that $P = \frac{12\,(\pi + 5)}{5\,\pi}$

(3)

4MB0/02 June 2015 Q 11 (especially part (f))

Sometimes, as in this example, candidates are asked to "explain".

$y = \frac{x^3}{6} + \frac{5}{x^2} - 8$

(a) Complete the table of values for $y = \frac{x^3}{6} + \frac{5}{x^2} - 8$, giving your values to 1 decimal place.

x	0.8	1	1.5	2	2.5	3	3.5	4
y	−0.1		−5.2	−5.4		−2.9		3.0

(3)

(b) On the grid, plot the points from your completed table and join them to form a smooth curve.

(3)

(c) Using your curve, determine an estimate of the minimum value, to 1 decimal place, of $\frac{x^3}{6} + \frac{5}{x^2} - 8$ in the interval $0.8 \leqslant x \leqslant 4$

(1)

(d) By drawing a suitable tangent to your curve, calculate an estimate, to 1 decimal place, of the gradient at the point where $x = 3$ on the curve.

(2)

(e) By drawing and labelling a straight line on the grid, find estimates, to 1 decimal place, of the two solutions of the equation $\frac{x^3}{6} - \frac{x}{4^2} + \frac{5}{x_2} - 4 = 0$ in the interval $0.8 \leqslant x \leqslant 4$

(4)

(f) Explain clearly why the equations $\frac{x^3}{6} + \frac{5}{x^2} - 2 = 0$ has no solution in the interval $0.8 \leqslant x \leqslant 4$

(3)

Understanding problem solving

All questions that require problem-solving skills require students to translate the problem into a series of mathematical processes. It will not be clear from the question what these processes are; it will be up to the student to interpret the question and determine the most appropriate method of solution. In some cases there will be choice of different methods of solution.

As with any question, it is important that students do show workings to go with their final answer. It is particularly important in these types of question, which are likely to attract more marks then those testing standard techniques. The majority of problem-solving questions will have all method marks with the final mark allocated to accuracy.

Another area that requires consideration in problem-solving questions is the maintenance of accuracy throughout a solution. Some questions will require a series of processes in which case students should avoid rounding numbers prematurely, only rounding the final answer.

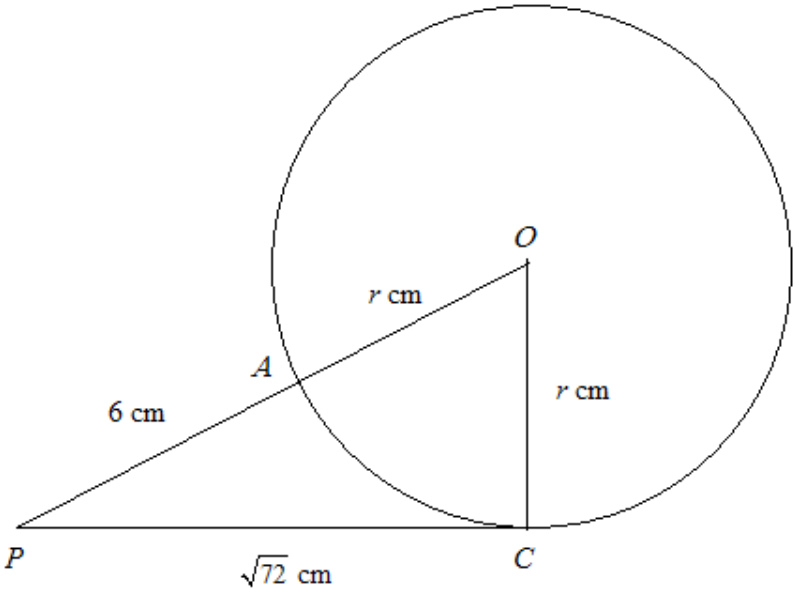
In order to develop problem-solving skills, students need as much practice as possible in solving different types of problem. A good source of problems will be past examination questions on International GCSE and GCSE papers.

Students should be encouraged to share their methods of solution, considering points such as whose method was the more efficient and why.

The following are all examples of questions where problem-solving skills, at varying levels, are required, taken from the SAMs papers.

SAMs Paper 01 Q 24

In this example some structure to the problem is provided.



A and C are two points on the circumference of a circle centre O and radius r cm.

The point P is such that PC is a tangent to the circle and PAO is a straight line.

Given that $PC = \sqrt{72}$ cm and $PA = 6$ cm,

(a) write down an equation in r,

(1)

(b) find the value of r,

(2)

(c) find the size, in degrees to 3 significant figures, of $\angle OPC$.

(2)

Mark	Working	Comments
B1	$(r + 6)^2 = r^2 + 72$ or $r = \sqrt{(r + 6)^2 = (\sqrt{72})^2}$ or $6 \times (6 + 2r) = 72$ (oe)	The candidates have to use their knowledge about tangents being perpendicular to a radius to see that angle *OCP* is 90° They then need to apply Pythagoras' theorem to form an equation in *r*. Some may use the intersecting chord theorem.
M1	$r^2 + 12r + 36 = r^2 + 72$ (oe) or $36 + 12r = 72$	Their equation needs simplifying so that they reach a linear equation or are just "one step" away from a linear equation.
A1	$r = 3$	They need to state that $r = 3$
M1	$\sin\angle OPC = \frac{'3'}{'3' + 6}$ (oe)	An expression using a suitable trigonometric ratio needs to be used.
A1	$\angle OPC = 19.5°$	The final answer should be stated. We would usually accept an answer rounding to 19.5

SAMs Paper 2 Q 9 (especially part (c) and part (d))

Left-handed and right-handed people do a test. It is found that 80% of left-handed people pass the test and 90% of right-handed people pass the test.

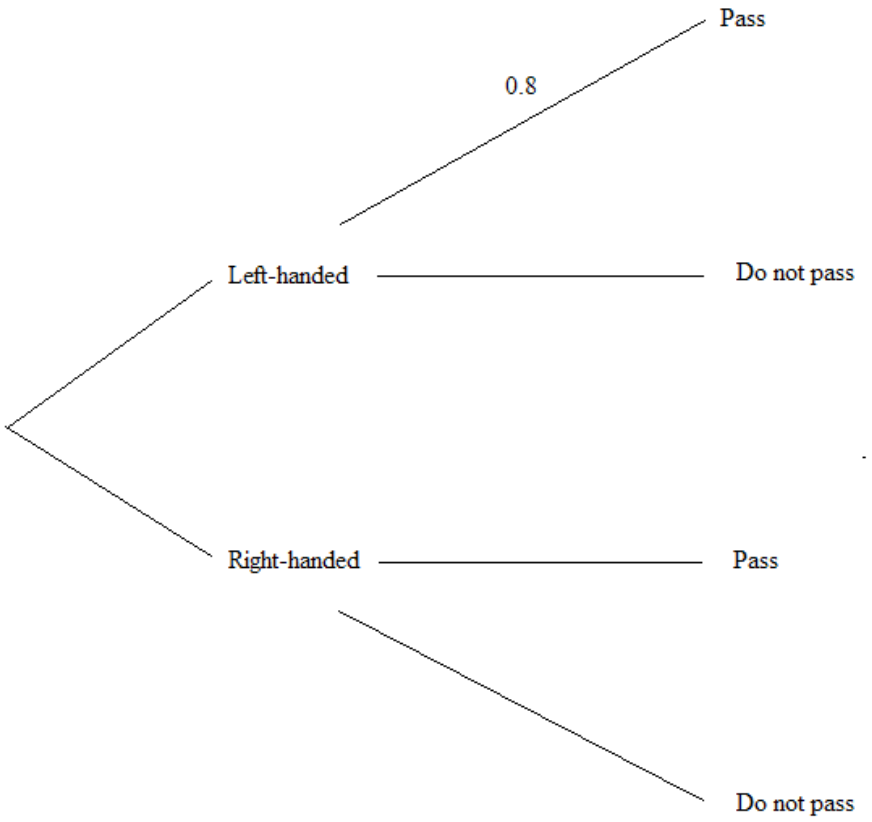
On the island of Sinestra, a fraction p of the population are left-handed and the remainder are right-handed.

A person on Sinestra is to be chosen at random to take the test.

(a) Write down the probability, in terms of p, that the person chosen is right-handed.

(1)

(b) Complete the probability tree diagram to show all the information.



(3)

On Sinestra the probability of passing the test is 5 times the probability of not passing the test.

(c) From your completed probability tree diagram, or otherwise, find the value of p.

(5)

A person on Sinestra is selected at random. Given that this person passed the test, use your answer to part (c) to

(d) determine the probability that this person is left-handed.

(3)

Mark Scheme for part (c)

Mark	Working	Comments
M1	P(pass) = 5 × (1 - P(pass))	Forming an equation to express the given relationship.
A1	P(pass) = $\frac{5}{6}$ or awrt 0.838	Solving to find P(pass)
M1	P(pass) = '$\frac{5}{6}$' one of $p \times 0.8$ or $(1 - p) \times$ '0.9'	Starting to form an expression for P(pass) in terms of p. Notice that we follow through their value of P(pass) for the next two method marks.
dM1	P(pass) = '$\frac{5}{6}$' = $p \times 0.8 + (1 - p) \times$ '0.9'	An expression using both branches of the tree diagram. This is dependent on having made a correct start.
A1	p = $\frac{2}{3}$ or accept 0.667	Solving to obtain a correct value for p.

Understanding mathematical reasoning

Questions testing students' mathematical reasoning skills can take a number of different forms. These types of question include those testing ability to:

- make deductions and draw conclusions

  E.g. extend a sequence, make an inference from given statistical information

- construct a chain of reasoning

  E.g. show all the steps when solving an equation

- present an argument or proof

  E.g. explain why a number is or is not in a sequence, give geometric reasons alongside a solution, give an algebraic proof

- interpret and communicate information accurately

  E.g. graph drawing, take a reading from a graph.

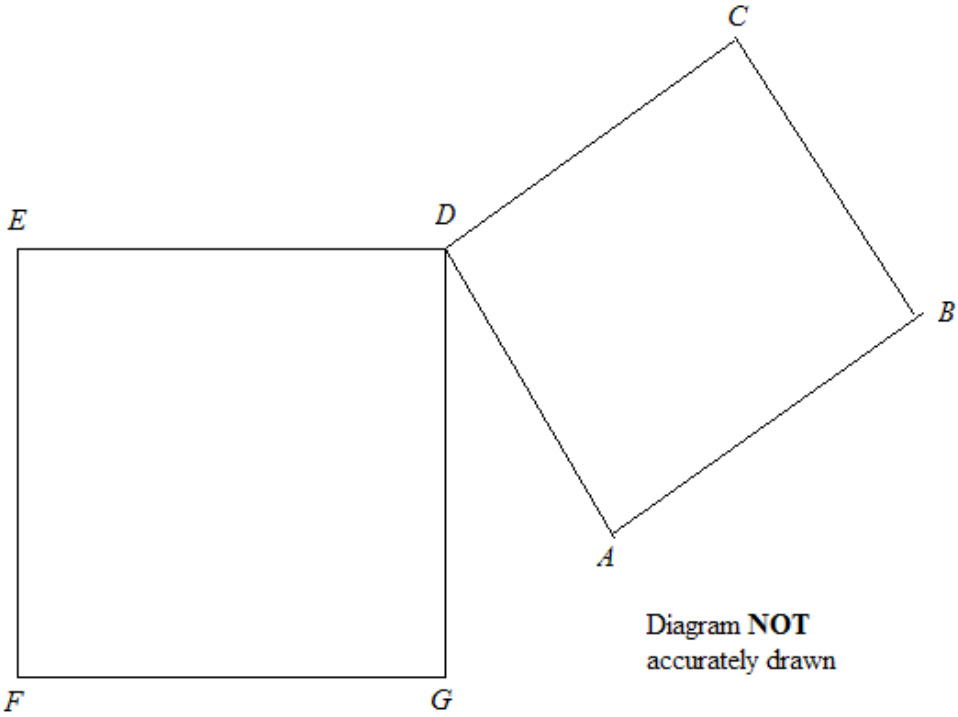
When answering questions with instructions such as 'Show that', 'Prove that', 'Show clear algebraic working', students must show all steps in their working; failure to do so could result in the loss of all marks even if the answer given is correct. When working with graphs students should take particular note of the scales given on the axes as these may be different. Errors often arise when reading from axes are taken; taken the simple step of drawing on vertical and horizontal lines on graphs to show where readings are obtained can help in this regard.

Having the correct equipment in the examination – protractor, ruler and pair of compasses – is also essential. Students should also practise using such equipment prior to the examination, particularly protractors where the wrong scale is frequently used.

The following are all examples of questions from the SAMs where reasoning skills, at varying levels, are required.

SAMs Paper 1 Q 17

This question requires a careful proof with justification given for each statement. The mark scheme shows that to achieve full marks these reasons must be given but some marks can be secured for a correct sequence of statements.



ABCD and *DEFG* are squares that are not identical.

Prove that $AE = CG$

(4 Marks)

Mark	Working	Comments
B1	(C $\angle EDG = \angle ADC = 90°$ and Q C $\angle ADG$ is common) $\angle EDA = \angle CDG$	They first need to state that the angles *EDA* and *CDG* are equal. A suitable reason would need to be given to secure the final mark.
B1	$\therefore \Delta s$ *EDA* GDC are congruent (SAS)	They need to state that the two triangles are congruent and a suitable reason should be stated (SAS).
dB1	Hence $AE = CG$	This mark would be dependent on the previous two statements for deducing the required result. The formal statement that since the triangles are congruent therefore $EA = GC$ would not be required provided the supporting argument was given.
B1	Two reasons (those in brackets above)	This final mark would only be awarded when a complete argument was given with the supporting reasons.

SAMs Paper 1 Q 21

x, y and n are three consecutive **even** numbers.

(a) Write down expressions for x and y in terms of n.

(1)

(b) Hence, show that the sum of three consecutive even numbers is a multiple of 6

(2)

(c) Find three consecutive positive even numbers whose sum is a square number.

(1)

Mark	Working	Comments
B1	*LH alignx* = $n - 4$, $y = n - 2$	For part (a) they needed to give two correct expressions.
M1	$3n - 6$	An expression for the sum of the 3 numbers was required.
A1	n even $\therefore$ $3n - 6$ is divisible by 6	An argument to show the required result. Good candidates would state that n must be of the form $n = 2r$ and by substitution show that $3n - 6$ therefore equals $6r - 6 = 6(r - 1)$ and therefore is divisible by 6
B1	e.g. 10, 12, 14 (oe)	Those who had the $6(r - 1)$ expression could easily see that $r = 7$ would give a result and hence arrive at these 3 numbers. It is worth using a question like this for further discussion with candidates and asking, for example, what other sets of 3 numbers they can find? Can they find a rule for generating all such sets?

SAMs Paper 2 Q 11 (especially parts (b) and (c))

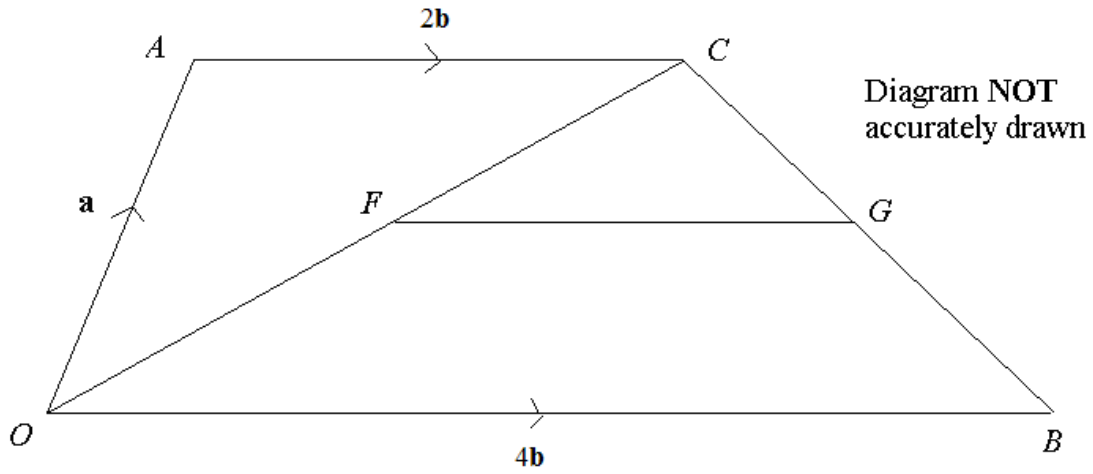


Figure 2

Figure 2 shows a quadrilateral $OACB$ where $\overrightarrow{OA} = \mathbf{a}$, $\overrightarrow{OB} = 4\mathbf{b}$ and $\overrightarrow{AC} = 2\mathbf{b}$

The point F on OC is such that $OF : OC = 2 : 5$

The point G on CB is such that $CG : CB = 3 : 5$

(a) Find, in terms of a and b,

(i) $\overrightarrow{OC}$,

(ii) $\overrightarrow{GC}$.

(4)

(b) (i) Show that $\overrightarrow{FG} = \lambda\,\mathbf{b}$, where λ is a constant.

(ii) Hence write down the value of λ.

(3)

(c) (i) Explain why ΔOCB is similar to ΔFCG.

(ii) Find the ratio (area of ΔOCB) : (area of ΔFCG) in the form m : n where m and n are integers.

(4)

The area of ΔFGC is 18 cm2

Calculate, in cm2

(d) (i) the area of ΔOCB,

(ii) the area of $OACB$.

(5)

Mark Scheme for parts (b) and (c)

Part (b)

Mark	Working	Comments
M1	$\overrightarrow{FG} = \frac{3}{5}$ '(**a** + 2**b**)' + $\frac{3}{5}$(2**b** – **a**)'	An expression for $\overrightarrow{FG}$ is required using their answers from part (a). At this point we would follow through their answers from (a).
A1	$\overrightarrow{FG} = \frac{12}{5}$**b**	The correct expression for $\overrightarrow{FG}$ is required and it must come from correct working.
B1ft	$\lambda = \frac{12}{5}$	This mark is a ft and so provided they have shown the required result this mark can be awarded.

Part (c)

Mark	Working	Comments
M1	From given ratios and (b), $\Delta s \frac{FGC}{OCB}$ are similar Q $\frac{FC}{OC} = \frac{CG}{CB} = \frac{FG}{OB} = \frac{3}{5}$ or give reasons for AAA or give reasons for SAS	The beginnings of a suitable argument should be given to establish that the 2 triangles are similar.
A1		A full argument specifying the sides and ratios.
M1	As $\Delta s \frac{FGC}{OCB}$ are similar, $\therefore \lvert\Delta OCB\rvert : \lvert\Delta FGC = 5^2 : 3^2$	They need to use the scale factor squared or some other method for finding the ratio of the areas, e.g. $\frac{\text{area } \Delta OCB}{\text{area } \Delta FCG} = \frac{\frac{1}{2} \times CO \times CB \times \sin C}{\frac{1}{2} \times CF \times CG \times \sin C}$
A1	25 : 9	For the correct ratio.

Delivery of the qualification- transferable skills

Why transferable skills?

Ensuring students have opportunities to acquire transferable skills, as well as subject specific knowledge, understanding and skills to improve their progression outcomes is a central part of Pearson Edexcel's International GCSE qualifications.

In recent years, higher education institutions and employers have consistently flagged the need for students to develop a range of transferable skills to enable them to respond with confidence to the demands of undergraduate study and the world of work.

We have developed our teaching materials and support to:

1) Increase awareness of transferable skills that are **already** being assessed (for both students and teachers) and

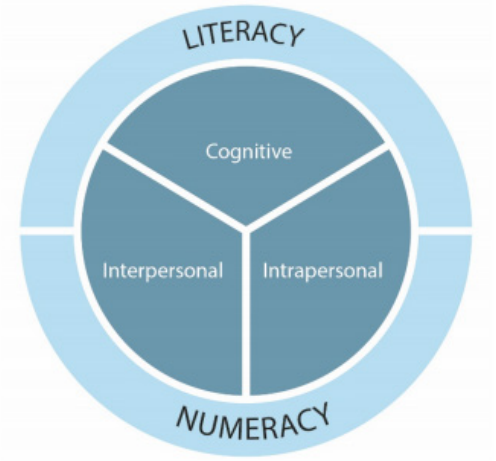
2) Indicate where, for teachers, there are opportunities to teach additional skills that won't be formally assessed, but that would be of benefit to students.

What are transferable skills?

The Organisation for Economic Co-operation and Development (OECD) defines skills, or competencies, as 'the bundle of knowledge, attributes and capacities that can be learned and that enable individuals to successfully and consistently perform an activity or task and can be built upon and extended through learning.' [1]

To support the design of our qualifications, the Pearson Research Team selected and evaluated seven global 21st-century skills frameworks. Following on from this process, we identified the National Research Council's (NRC) framework [2] as the most evidence-based and robust skills framework, and have used this as a basis for our adapted skills framework.

The framework includes cognitive, intrapersonal skills and interpersonal skills.



[1] (OECD (2012), Better Skills, Better Jobs, Better Lives (2012):http://skills.oecd.org/documents/OECDSkillsStrategyFINALENG.pdf)

[2] Koenig, J. A. (2011) Assessing 21st Century Skills: Summary of a Workshop, National Research Council)

What can I do if I want to see improved student outcomes through the development of transferable skills?

For each of our International GCSE subjects we will provide a subject-specific interpretation of each of the identified skills and a comprehensive mapping as to how these elements can be developed and where they link to assessment.

The skills have been interpreted for this qualification to ensure they are appropriate for the subject. All of the skills identified are evident or accessible in the teaching, learning and/or assessment of the qualification. Some skills are directly assessed. Pearson materials will support you in identifying these skills and developing them in your students.

Please refer to the 'Teaching and Learning Materials' section of the qualification webpage for more Pearson materials to support you in identifying and developing these skills in students.

Course planner

You will find a course planner in the Scheme of Work document, which gives suggested teaching times for each unit. This is broken down by Assessment Objective and is editable so that you can customise it to meet your own needs.

Suggested Resources

We recognise that new resources will become available throughout the lifetime of a qualification. We will therefore supply a version of this resource list on our website, which will be updated on an ongoing basis.

Name of resource	Link and info
Maths Emporium	This **free** website is intended for the use of teachers of mathematics in secondary schools http://www.edexcelmaths.com/
Sample assessment material and specimen papers	http://qualifications.pearson.com/en/qualifications/edexcel-international-gcses-and-edexcel-certificates/international-gcse-mathematics-b-2016.html
Dedicated Maths Subject Advisor	Teachingmaths@pearson.com
examWizard	examWizard is a free online resource for teachers containing a huge bank of past paper questions and support materials to help you create your own mock exams and tests. http://qualifications.pearson.com/en/support/Services/examwizard.html
ResultsPlus	ResultsPlus is a free online results analysis tool for teachers that gives you a detailed breakdown of your students' performance in Edexcel exams. http://qualifications.pearson.com/en/support/Services/ResultsPlus.html

B Getting started for students

Student guide

Why study the Pearson Edexcel International GCSE in Mathematics B?

This course will enable you to:

- develop your problem-solving skills by translating problems in mathematical or non-mathematical contexts
- develop reasoning skills through exercises such as presenting arguments and proofs, and making deductions and drawing conclusions from mathematical information.

What do I need to know, or be able to do, before taking this course?

We recommend that students are able to read and write in English at Level B2 of the Common European Framework of Reference for Languages, otherwise there are no prior learning requirements for this qualification.

Is this the right subject for me?

Have a look at our qualification overview to get an idea of what's included in this qualification. Then, why not get in touch with our student services, students@pearson.com, to discuss any outstanding questions you might have?

You could also have a look at http://qualifications.pearson.com/en/campaigns/pearson-qualifications-around-the- world.html#tab-Edexcel to find out what students and education experts around the world think about our qualifications.

We also offer a Mathematics A and you may feel that the approach used in this specification is more suitable for you.

How will I be assessed?

This qualification is 100% examination.

What can I do after I've completed the course?

You can progress from this qualification to:

- the Pearson Edexcel International GCSE in Further Pure Mathematics
- the GCE Advanced Subsidiary (AS) and Advanced Level in Mathematics, Further Mathematics or Pure Mathematics
- the International Advanced Subsidiary (AS) and Advanced Level in Mathematics, Further Mathematics or Pure Mathematics
- other equivalent, Level 3 Mathematics qualifications
- further study in other areas where mathematics is required
- further training or employment where numeracy skills and knowledge are required.

What next?

Talk to your subject teacher at school or college for further guidance, or if you are a private candidate you should visit http://qualifications.pearson.com/en/support/support-for you/students.html

For information about Edexcel, BTEC or LCCI qualifications
visit qualifications.pearson.com

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