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INTERNATIONAL GCSE
Mathematics (Specification B)

Specification and Sample Assessment Material

Edexcel International GCSE in Mathematics
(Specification B) (4MB0)

First examination 2011

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Pearson Education Ltd is one of the UK's largest awarding organisations, offering academic and vocational qualifications and testing to schools, colleges, employers and other places of learning, both in the UK and internationally. Qualifications offered include GCSE, AS and A Level, NVQ and our BTEC suite of vocational qualifications, ranging from Entry Level to BTEC Higher National Diplomas. Pearson Education Ltd administers Edexcel GCSE examinations.

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Introduction

The Edexcel International General Certificate of Secondary Education (International GCSE) in Mathematics (Specification B) is designed for use in schools and colleges. It is part of a suite of International GCSE qualifications offered by Edexcel.

The range of grades available for this specification is the International GCSE Higher Tier, A* – D with a 'safety net' grade E available.

Key subject aims

The Edexcel International GCSE in Mathematics (Specification B) encourages students to:

- develop 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 to use mathematics to solve problems
- appreciate the importance of mathematics in society, employment and study.

About this specification

Key features and benefits of the specification

The Edexcel International GCSE in Mathematics (Specification B) has been developed to:

- enable students to acquire knowledge and skills with confidence, satisfaction and enjoyment
- provide papers that are balanced in terms of topics and difficulty
- provide a solid basis for students wishing to progress to Edexcel's AS and Advanced GCE, or equivalent qualifications.

Contents

Specification at a glance

The Edexcel International GCSE in Mathematics (Specification B) comprises of two externally assessed papers.

This specification is offered through a single tier.

Questions are targeted at grades in the range A* – D.

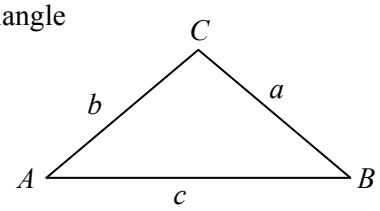
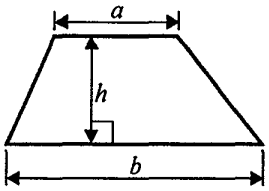
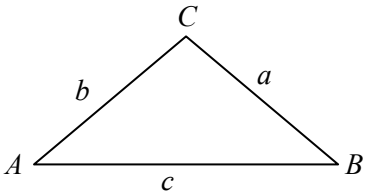
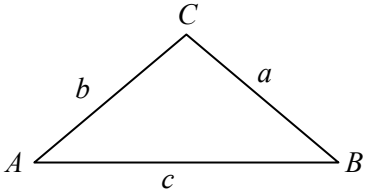
There is a 'safety net' grade E for students who narrowly fail to achieve grade D.

Students who fail to achieve grade E will be awarded Ungraded.

Paper 1	**Paper code: 4MB0/01**
• Externally assessed • Availability: January and June series • First assessment: June 2011	**33⅓% of the total International GCSE marks**
Overview of content • Number and algebra • Geometry and trigonometry • Statistics and probability	
Overview of assessment • The assessment will be 1 hour 30 minutes. • The paper will carry a total of 100 marks. • The paper will consist of around 26 to 30 questions with varying mark allocations per question, which will be stated on the paper. • The paper will address all the Assessment Objectives. • The overall assessment will have approximately equal marks available for each of the targeted grades. • Diagrams will not necessarily be drawn to scale and measurements should not be taken from diagrams unless instructions to this effect are given. • Students may need to use mathematical instruments eg pair of compasses, ruler, protractor. • Calculators are allowed. • The paper will contain questions from any part of the specification content, and the solution of any question may require knowledge of more than one section of the specification content. • Questions will be set in SI units.	

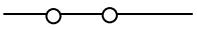
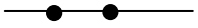
Paper 2	**Paper code: 4MB0/02**
• Externally assessed • Availability: January and June series • First assessment: June 2011	**66⅔% of the total International GCSE marks**
Overview of content • Number and algebra • Geometry and trigonometry • Statistics and probability	
Overview of assessment: • The assessment will be 2 hours and 30 minutes. • The paper will carry a total of 100 marks. • The paper will consist of about 12 questions with varying mark allocations per question, which will be stated on the paper. • The paper will address all the Assessment Objectives. • The overall assessment will have approximately equal marks available for each of the targeted grades. • Diagrams will not necessarily be drawn to scale and measurements should not be taken from diagrams unless instructions to this effect are given. • Students may need to use mathematical instruments, for example pair of compasses, ruler, protractor. • Calculators are allowed. • The paper will contain questions from any part of the specification content, and the solution of any question may require knowledge of more than one section of the specification content. • Questions will be set in SI units. • Where a question on Paper 2 requires the use of one of the following formulae, that formula will be given at the end of the question.	

Formulae to be given in Paper 2

Circumference of a circle	$2\pi r$
Area of circle	πr^2
Area of triangle 	$\frac{1}{2}bc\sin A$
Area of trapezium 	$\frac{1}{2}(a+b)h$
Curved surface area of right circular cylinder	$2\pi rh$
Curved surface area of right circular cone	πrl
Surface area of sphere	$4\pi r^2$
Volume of pyramid	$\frac{1}{3}$ × base area × height
Volume of right circular cone	$\frac{1}{3}\pi r^2 h$
Volume of sphere	$\frac{4}{3}\pi r^3$
Sum of interior angles of polygon	$(2n-4)$ right angles
Solutions of $ax^2+bx+c=0$	$x=\frac{-b\pm\sqrt{(b^2-4ac)}}{2a}$
Determinant of matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$	$ad-bc$
Inverse of matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$	$\frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$
Sine rule 	$\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$
Cosine rule 	$a^2=b^2+c^2-2bc\cos A$

Notation

The notation used will include the following.

$\{\quad\}$	the set of
n(A)	the number of elements in the set A
$\{x:\quad\}$	the set of all x such that
$\in$	is an element of
$\notin$	is not an element of
$\varnothing$	the empty (null) set
$\mathcal{E}$	the universal set
$\cup$	union
$\cap$	intersection
$\subset$	is a subset of
A'	the complement of the set A
PQ	operation Q followed by operation P
f: $A \to B$	is a function under which each element of set A has an image in set B
f: $x \mapsto y$	f is a function under which x is mapped to y
f(x)	the image of x under the function f
f^{-1}	the inverse relation of the function f
fg	the function g followed by function f, ie f(g(x))
	open interval on the number line
	closed interval on the number line
a	the vector **a**
$\overrightarrow{AB}$	the vector represented in magnitude and direction by $\overrightarrow{AB}$ the vector from point A to point B
$\lvert a \rvert$	the magnitude of vector **a**

Calculators

Students are expected to have access to a calculator with at least the following keys:

+, –, ×, ÷, π, x^2, $\sqrt{x}$, $\frac{1}{x}$, x^y, sine, cosine and tangent and their inverses in degrees and decimals of a degree.

Calculators with any of the following facilities are prohibited in any examination:

- databanks; retrieval of text or formulae; QWERTY keyboards; built-in symbolic algebra manipulations; symbolic differentiation or integration.

Qualification content

Knowledge, skills and understanding

This Edexcel International GCSE in Mathematics (Specification B) requires students to demonstrate application and understanding of:

Number and algebra

- The use of numerical skills in a purely mathematical way and in real-life situations.
- Set theory and notation.
- The use of letters as equivalent to numbers and as variables.
- The distinction between expressions, equations and formulae.
- The use of algebra to set up and solve problems.
- Techniques of algebraic manipulation.
- The use of functions of one variable.
- The construction and interpretation of graphs.
- The use of matrices.

Geometry and trigonometry

- The properties of angles.
- A range of transformations in a plane.
- The application of the metric system in real-life problems.
- The ideas of space and shape.
- The use of rulers, compasses and protractors appropriately to construct shapes.
- The use of vectors and vector notation.
- The use of trigonometry in two and three dimensional problems.

Statistics and probability

- The basic ideas of statistical techniques.
- The basic ideas of probability.

Content overview

- Number
  - Number
  - Sets
- Algebra
  - Algebra
  - Functions
  - Matrices
- Geometry
  - Geometry
  - Mensuration
  - Vectors
  - Trigonometry
- Statistics

Assessment overview

- Two written papers set and marked by Edexcel
- Paper 1 lasts 1 hour 30 minutes, Paper 2 lasts 2 hours 30 minutes
- The total number of marks for each paper is 100
- Paper 1 weighted at $33\frac{1}{3}$% of the qualification, Paper 2 weighted at $66\frac{2}{3}$% of the qualification
- Both papers targeted at grades A* – D

Specification content

1	Number	Notes
	The ordinary processes of number manipulation	The 'four operations' and combination of them by use of brackets
	Prime numbers, factors, multiples	To include finding HCF and LCM in simple cases where they can be found by inspection
	Indices, powers and roots	Use index notation and index laws for multiplication and division involving integer, fractional and negative powers
	Simple manipulation of surds	Students should understand what surds represent and their use for exact answers Manipulation will be simple For example: $5\sqrt{3} + 2\sqrt{3} = 7\sqrt{3}$ $\sqrt{48} = 4\sqrt{3}$
	Rationalising the denominator where the denominator is a pure surd	$10 \times \frac{1}{\sqrt{5}} = 2\sqrt{5}$
	Natural numbers, integers, rational and irrational numbers	Recognitions of these sets Proofs of irrationality will not be required
	Weights, measures and money	Carry out calculations using standard units of mass, length, area, volume and capacity, time Metric and SI units only Carry out calculations using money, including converting between currencies (where conversion is required, the rate of conversion will always be given)
	Fractions, decimals, ratio, proportion and percentage	Students will be expected to interchange any of these methods of fractional representation and to select the most appropriate to given situations Ratios and proportions are required in, at most, three proportions, ie $a:b$ or $a:b:c$ Students will be expected to use the four operations with fractions and decimals, and use percentages, ratio and/or proportion in problems

		Notes
	Expressing numbers to a given degree of accuracy	Correction to a given number of decimal places or significant figures
	Numbers in standard form	$a \times 10^n$, where n is an integer and $1 \leq a < 10$
		Solve problems involving standard form
		Questions may involve the application of any of the techniques listed in (1) to problems of everyday personal, domestic or community life

2	Sets	Notes
	The idea of a set	
	Set language and notation	Questions may be set involving these ideas in the abstract or derived from practical situations
	Union and intersection of sets	Understand sets defined in algebraic terms
	Number of elements in a set	Use the notation n(A)
	Complementary sets	Use the notation A'
	Subsets	
	Universal set, null set	
	Venn diagrams and their use in simple logical problems	
	Use of symbols to represent sets	

3	Algebra	Notes
	The basic processes of algebra	Collecting like terms, using the four operations, the rules of indices, with integers and fractional powers
	The construction, interpretation and use of formulae and their manipulation	To include change of subject of a formula and substitution
	The factorisation of simple algebraic expressions	
	Use of the factor theorem for integer values of the variable	Including application to cubics
	The manipulation of simple algebraic fractions, the denominators being numerical, linear or quadratic	Simple cases involving sum, difference, product and quotient of algebraic fractions
	Solution of equations of 1^{st} and 2^{nd} degree containing one unknown quantity	Solution of quadratics to include solution by factorisation, by graph, by completing the square or by formula
		Problems which result in the solution of such equations may also be set
	Solution of linear simultaneous equations in two unknowns	Simple questions may be set requiring the graphical solution of simultaneous linear equations
	Solution of linear inequalities, and the representations of solutions on the number line and two-dimensional space	Simple questions may be set requiring the graphical solution of simultaneous linear inequalities
		No questions will be set on linear programming
	The idea of a sequence	Being able to recognise sequences with a common difference or common integer sequences, and to continue a given sequence

4	**Functions**	**Notes**
	The idea of a function of a variable Function as a mapping or as a correspondence between the elements of two sets Use functional notations of the form f(x) =… and f: $x \mapsto$	
	Domain and range of a function	Questions will not be set on continuity, but students will be expected to recognise when parts of the domain need to be excluded (eg $x = 0$ must be excluded from the domain of the function f where f(x) = $\frac{1}{x}$)
	Composite functions	'fg' will mean 'do g first then f'
	Inverse functions	Finding the inverse of a function
	Variation, direct and indirect proportion	To include the following cases: $y \propto x; y \propto \frac{1}{x}; y \propto x^2; y \propto \frac{1}{x^2}; y \propto x^3;$ $y \propto \frac{1}{x^3}$
	Rectangular cartesian coordinates	
	Graphs and graphical treatment of the equation: $y = Ax^3 + Bx^2 + Cx + D + \frac{E}{x} + \frac{F}{x^2}$	Students will be expected to draw and interpret graphs from given equations
	in which the constants are numerical and at least three of them are zero	Use of the intersection of two curves (graphs) to solve equations
	The gradients of these graphs by drawing	Students will be expected to draw a reasonable tangent to the graph at a named point and to construct an appropriate right-angled triangle from which to calculate the gradient
	Differentiation of integer powers of x	Use of $\frac{\mathrm{d}y}{\mathrm{d}x}$ notation
	Determination of gradients, rates of change, maxima and minima, stationary points	Students will either be required to differentiate or use graphical methods to arrive at solutions and relate their calculations to their graphs and vice versa

		Notes
	Applications to linear kinematics and to other simple practical problems	This includes the drawing and interpretation of distance/time and speed/time graphs and other graphs of a similar nature Students need to be able to understand the relationship between displacement or distance, velocity and speed, and acceleration, for example: $\frac{ds}{dt} = v$ and $\frac{dv}{dt} = a$

5	Matrices	Notes
	Representation of data by a matrix	
	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
	Multiplication of a matrix by a scalar	
	Unit (identity) matrix and zero (null) matrix	Of order not more than 3 × 3
	Determinants and inverses of non-singular 2 × 2 matrices	Knowledge of singular matrices is not required
	Transformations of the plane associated with 2 × 2 matrices	Tranformations include: Reflections in any line Rotations about any point Translations Enlargements
	Combination of transformations	If an invariant of a transformation is required algebraically, a lead will be given

6	Geometry	Notes
	Geometrical properties of Euclidean space, as listed below	In solving any problem or rider, students may use any knowledge they possess. Solutions may be by traditional methods (eg congruent triangles), vectors, the use of transformations such as translation, reflection, rotation and enlargement, or a mixture of these. Formal proofs of theorems will not be required
	Angle properties of parallel lines, triangles and polygons, including regular polygons	Angles on a straight line, angles round a point Angles measured anticlockwise will be taken as positive; clockwise as negative
	Properties of the parallelogram, rectangle, square, rhombus, trapezium and kite	
	Symmetry about a point, line or plane	Recognise line and rotational symmetry Complete shapes with a given axis of symmetry and order of rotational symmetry
	Use of Pythagoras' theorem in 2D and 3D	Including its use in any acute angled triangle where an altitude is given or constructed. The angle bisector theorems are excluded
	Similarity: areas and volumes of similar figures	Understanding how scale factors are related to area and volume
	Congruent shapes	
	Chord, angle and tangent properties of circles	To include knowledge of the intersecting chord properties (both internal and external) and the alternate segment theorem
	Loci in 2 dimensions	Any accurate method using normal geometrical instruments will be acceptable 'Tracing paper' methods will not be acceptable
	Constructions of bisector of an angle and of perpendicular bisector (mediator) of a straight line	Ruler and compass constructions only

7	**Mensuration**	**Notes**
	Length, area, volume	
	Mensuration of two dimensional shapes, rectangle, parallelogram, trapezium, triangle, circle	Straightforward calculations, where appropriate, of areas of the shapes mentioned and also of two dimensional shapes which can be divided into a collection of such shapes (eg trapezia, polygons)
	Mensuration of the three dimensional shapes, right circular cylinder, right circular cone and sphere, cuboid, pyramid, prism	Straightforward calculations, where appropriate, of volumes of the shapes mentioned and also of two dimensional shapes which can be divided into a collection of such shapes (eg trapezia, polygons)
	Length of an arc, area of a sector of a circle	Radian measure is excluded

8	Vectors	Notes
	Scalar and vector quantities	Vectors will be in 2 dimensions only
	Understand and use vector notation	The notations $\overrightarrow{OA}$ and **a** will be used, as will column vectors
	Representation of a vector by a directed line segment	
	Parallel vectors, unit vectors	
	Sum and difference of two vectors	
	Modulus (magnitude) of a vector	
	Multiplication of a vector by a scalar	
	Find the resultant of two or more vectors	
	Apply vector methods to simple geometrical problems	The problems may involve colinearity, parallel lines and concurrency
	Multiplication of a vector by a matrix	To include the finding of a matrix for a given transformation of the plane, using the unit base vectors. These transformations will be those for which the origin is unchanged

9	Trigonometry	Notes
	Use of sine, cosine and tangent of angles up to 180^o	Angles will be measured in degrees and decimals of a degree
	Solution of problems in 2 and 3 dimensions by calculation and by drawing	Use of the sine and cosine rule
		Area of a triangle = $\frac{1}{2}bcsinA$
		Questions on latitude and longitude will not be set
		Calculations of the angle between two planes, or of the angle between a straight line and a plane will not be set
	Angles of elevation and depression	Angles will be given in degrees and decimals of a degree; the normal convention of bearings being measured clockwise will be adopted
	Bearings	

10	Statistics and probability	Notes
	Graphical representation of numerical data	To include bar diagrams, circular diagrams (pie charts) and histograms Cumulative frequency graphs are excluded
	Determination of the mean, median and mode for a discrete data set	
	Calculation of an estimate of the mean of a larger number of quantities given in grouped frequencies	Questions involving weighted or moving means will not be set
	Determination of a modal class and the median for grouped data	
	Understand the language and basic concepts of probability	To include the probability scale, sample spaces, relative frequency, probabilities and complements
	Use of addition rule for two or more mutually exclusive events	Knowing that when A and B are mutually exclusive events, $P(A \text{ or } B) = P(A) + P(B)$
	Use of product rule for two or more independent events	Knowing that when A and B are independent events, $P(A \text{ and } B) = P(A) \times P(B)$
	Determination of the probability of two or more independent events	The use of tree diagrams will be expected
	Using simple conditional probability for combined events	
	Using very simple conditional probability	

Assessment

Assessment summary

Papers 1 and 2 are externally assessed examination papers.

Paper 1	**Paper code: 4MB0/01**
• 1 hour and 30 minutes long • 100 marks • Calculator allowed • About 26 to 30 questions	
Paper 2	**Paper code: 4MB0/02**
• 2 hours and 30 minutes long • 100 marks • Calculator allowed • Formulae provided • About 12 questions	

Assessment Objectives and weightings

	% 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 expressions • sequences, functions and graphs • matrices	**60%**
AO2: demonstrate knowledge, understanding and skills in shape, space and measures: • geometry • vectors and transformation geometry • trigonometry	**30%**
AO3: demonstrate knowledge, understanding and skills in handling data: • statistics • probability	**10%**
TOTAL	**100%**

Relationship of Assessment Objectives to papers for International GCSE

Paper number	Assessment Objective			
	AO1	AO2	AO3	Total for AO1, AO2 and AO3
Paper 1	20%	10%	$3\frac{1}{3}\%$	$33\frac{1}{3}\%$
Paper 2	40%	20%	$6\frac{2}{3}\%$	$66\frac{2}{3}\%$
Total for International GCSE	60%	30%	10%	100%

Entering your students for assessment

Student entry

Details of how to enter students for this qualification can be found in Edexcel's *International Information Manual*, copies of which are sent to all active Edexcel centres. The information can also be found on Edexcel's international website.

Combinations of entry

There are no forbidden combinations.

Access arrangements and special requirements

Edexcel's policy on access arrangements and special considerations for GCE, GCSE, International GCSE, and Entry Level qualifications aims to enhance access to the qualifications for students with disabilities and other difficulties without compromising the assessment of skills, knowledge, understanding or competence.

Please see the Edexcel website (www.edexcel.com/sfc) for:

- the *Joint Council for Qualifications (JCQ) policy Access Arrangements and Special Considerations, Regulations and Guidance Relating to Students who are Eligible for Adjustments in Examinations*
- the forms to submit for requests for access arrangements and special considerations
- dates for submission of the forms.

Requests for access arrangements and special considerations must be addressed to:

Special Requirements
Edexcel
One90 High Holborn
London WC1V 7BH

Assessing your students

The first assessment opportunity for Paper 1 and Paper 2 of this qualification will take place in the June 2011 series and in each following January and June series for the lifetime of the specification.

Your student assessment opportunities

Paper	June 2011	January 2012	June 2012	January 2013
Paper 1 and Paper 2	✓	✓	✓	✓

Awarding and reporting

The grading, awarding and certification of this qualification will follow the processes outlined in the current GCSE/GCE Code of Practice for courses starting in September 2009, which is published by the Qualifications and Curriculum Authority (QCA). The International GCSE qualification will be graded and certificated on a six-grade scale from A* to E.

Students whose level of achievement is below the minimum standard for Grade E will receive an unclassified U. Where unclassified is received it will not be recorded on the certificate.

The first certification opportunity for the Edexcel International GCSE in Mathematics (Specification B) will be June 2011.

Language of assessment

Assessment of this specification will be available in English only. Assessment materials will be published in English only and all work submitted for examination must be produced in English.

Malpractice and plagiarism

For up-to-date advice on malpractice and plagiarism, please refer to the Joint Council for Qualifications *Suspected Malpractice in Examinations: Policies and Procedures* document on the JCQ website www.jcq.org.uk.

Student recruitment

Edexcel's access policy concerning recruitment to our qualifications is that:

- they must be available to anyone who is capable of reaching the required standard
- they must be free from barriers that restrict access and progression
- equal opportunities exist for all students.

Progression

This qualification supports progression to:

- International GCSE in Further Pure Mathematics
- GCE AS and A Level in Mathematics
- GCE AS and A Level in Further Mathematics
- GCE AS and A Level in Pure Mathematics
- GCEs and other Level 3 qualifications in numerate disciplines, such as the sciences, economics and business
- further training or employment where numerate skills and knowledge are required.

Grade descriptions

The following grade descriptions indicate the level of attainment characteristic of the given grade at International GCSE. They give a general indication of the required learning outcomes at each specified grade. The descriptions should be interpreted in relation to the content outlined in the specification; they are not designed to define that content. The grade awarded will depend in practice upon the extent to which the candidate has met the Assessment Objectives overall. Shortcomings in some aspects of the examination may be balanced by better performances in others.

Grade A

In addition to the requirements for Grade C, candidates can:

- demonstrate that they have a good understanding and ability to perform numerical calculations. They can apply fractional indices and indices expressed in algebraic terms to problems
- apply mensuration to complex problems involving polygons, circles and three dimensional shapes which may involve algebraic manipulation
- solve complex literal problems involving Venn diagrams
- construct and apply an algebraic formula to solve a problem in a literal context
- successfully change the subject in a complex formula
- use the factor theorem effectively
- apply the solution of quadratic and simultaneous equations to literal problems
- solve complex problems using intersections and gradients of graphs
- correctly identify the domain and range for suitable functions and manipulate composite functions effectively
- differentiate using integer powers of x and can use the process of differentiation to determine rates of change, maxima and minima
- apply differentiation to linear kinematics and other simple problems
- manipulate matrices in complex problems
- effectively manipulate vectors when applied to complex problems

- apply geometrical properties and theorems to complex problems and can give reasons for their conclusions
- successfully apply trigonometrical rules in complex problems in either 2 or 3 dimensions
- interpret and construct histograms
- recognise when and how to work with probabilities associated with independent and mutually exclusive events
- understand the concept of conditional probability where the outcome of the second event is dependent on the outcome of the first event.

Grade C

Candidates can:

- apply the four operations of arithmetic
- use fractions and decimals, calculate ratios and percentages
- express numbers to a given degree of accuracy and understand Standard Form
- identify HCF and LCM in simple cases
- manipulate indices where the index is a positive integer value
- apply numerical techniques to everyday problems
- understand and use the equivalences between fractions, decimals and percentages and calculate using ratios in appropriate situations
- represent inequalities using a number line
- calculate lengths, areas and volumes of the shapes stated in the specification content
- understand and apply the notation of union, intersection, complement and number of elements of a set and apply this notation to simple Venn diagrams
- demonstrate that they are competent with algebraic manipulation
- construct and apply a simple algebraic formula to solve a simple problem
- change the subject of a formula in a simple case
- factorise simple algebraic expressions
- solve two linear simultaneous equations, either by algebraic or graphical methods
- solve quadratic equations, either by factorisation or by use of the formula
- handle simple linear inequalities and understand and use simple sequences
- understand the concept of a function of a variable
- find the inverse of a function
- draw a graph of a function from table data
- solve simple problems involving variation
- find the gradient of graph by drawing a suitable tangent
- understand and use compound measures such as speed
- understand and effectively manipulate vectors and matrices
- understand simple transformations associated with 2×2 matrices
- understand and use angle properties of parallel lines, triangles and polygons

- understand and use the geometrical properties of the circle
- apply the concept of similarity to simple problems
- understand and apply Pythagoras' theorem and basic trigonometry in 2 dimensions
- apply and calculate angles of elevation and depression in simple problems
- represent data graphically by using bar and pie charts
- calculate the mean of a small number of quantities or calculate an estimate of the mean of grouped data
- calculate simple probabilities and construct simple tree diagrams.

Support and training

Edexcel support services

Edexcel has a wide range of support services to help you implement this qualification successfully.

ResultsPlus – ResultsPlus is an application launched by Edexcel to help subject teachers, senior management teams, and students by providing detailed analysis of examination performance. Reports that compare performance between subjects, classes, your centre and similar centres can be generated in 'one-click'. Skills maps that show performance according to the specification topic being tested are available for some subjects. For further information about which subjects will be analysed through ResultsPlus, and for information on how to access and use the service, please visit www.edexcel.com/resultsplus.

Ask the Expert – Ask the Expert is a new service, launched in 2007, that provides direct email access to senior subject specialists who will be able to answer any questions you might have about this or any other specification. All of our specialists are senior examiners, moderators or verifiers and they will answer your email personally. You can read a biography for all of them and learn more about this unique service on our website at www.edexcel.com/asktheexpert.

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Training

A programme of professional development and training courses, covering various aspects of the specification and examination, will be arranged by Edexcel. Full details can be obtained from our website: www.edexcel.com

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International GCSE

Mathematics (Specification B) (4MB0)

Sample Assessment Material

First examination 2011

ALWAYS LEARNING

PEARSON

Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						4	M	B	0	/	0	1	Signature	

Paper Reference(s)

4MB0/01

Examiner's use only

Team Leader's use only

Edexcel International GCSE

Mathematics B

Paper 1

Sample Assessment Material

Time: 1 hour 30 minutes

Materials required for examination
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator.
Tracing paper may be used.

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions in the spaces provided in this question paper.
If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
Full marks may be obtained for answers to all questions.
There are 30 questions in this question paper. The total mark for this paper is 100.
There are 16 pages in this question paper. Any blank pages are indicated.
You may use a calculator.

Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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1. Richard Divers played Bobby Spinsky in a chess tournament. They played a total of 48 games. The results for these 48 games were:

Richard Divers won	26 games
Bobby Spinsky won	14 games
Drawn	8 games

A pie chart is to be drawn to show this information.

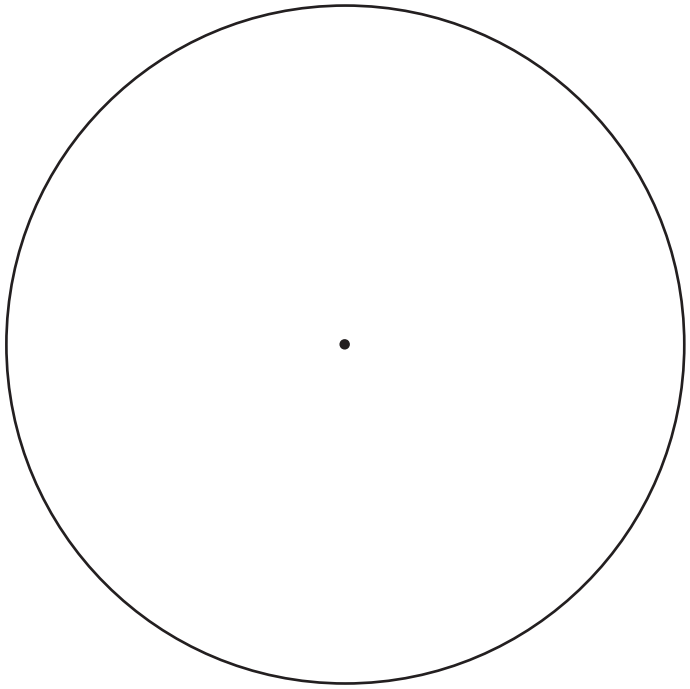
(a) Calculate the size, in degrees, of the angle of the sector representing the number of games won by Richard Divers.

°

.....

(2)

(b) Using the circle, draw an accurate pie chart illustrating the information.
State clearly the size of the angle of each sector.



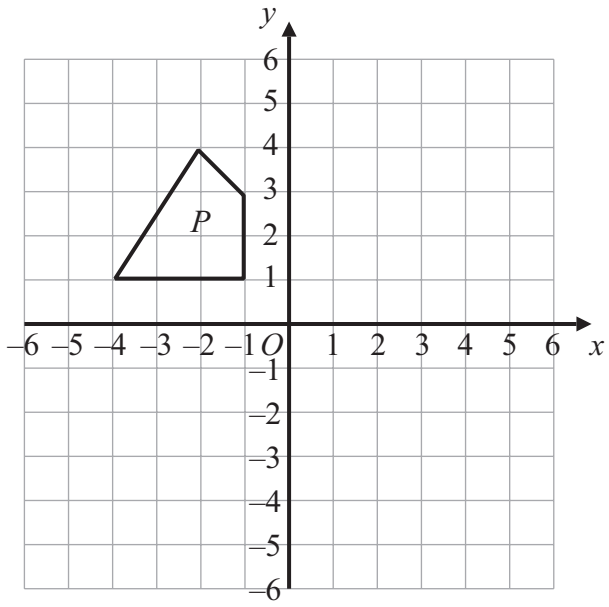
(2)

Q1

(Total 4 marks)

Leave blank

2.



The shape P is transformed to the shape Q by a clockwise rotation of 90° about the point (2, 0).

(a) Draw and label the shape Q on the grid.

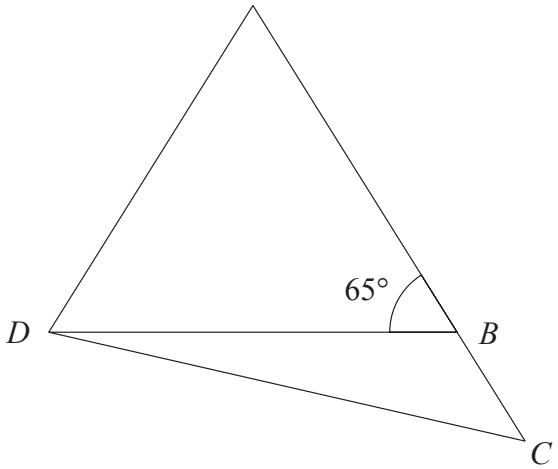
(2)

The shape Q is transformed to the shape R by a reflection in the line $y = 1$

(b) Draw and label the shape R on the grid.

(2) **Q2**

3. **(Total 4 marks)**



ABD is an isosceles triangle with $AB = AD$, and $\angle ABD = 65°$.
The side AB is extended to the point C so that $AD = DC$.
Find the size, in degrees, of $\angle BDC$.

°

.....

Leave blank

4. Find the Highest Common Factor (HCF) of 135, 180 and 225

.....

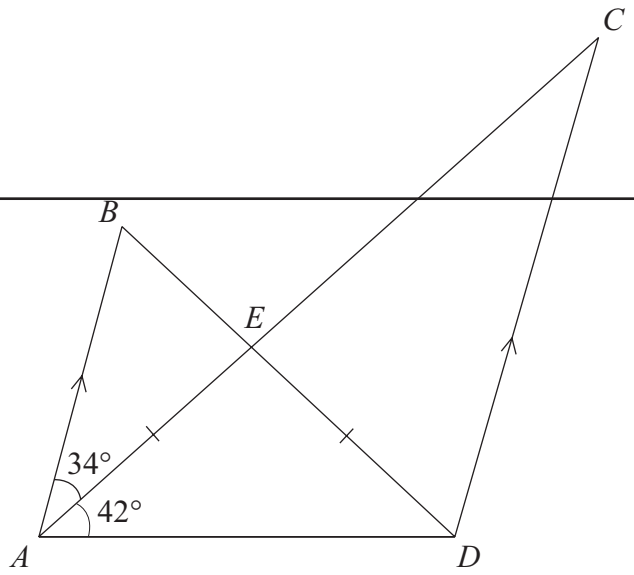
5. Given that $x : y = 6 : 5$ and $y : z = 4 : 5$, find the ratios $x : y : z$, in integer form.

$x : y : z =$ .....

Q3

(Total 3 marks)

6.



In the diagram, AB is parallel to DC, $AE = ED$, $\angle EAB = 34°$ and $\angle EAD = 42°$. Calculate the size, in degrees, of $\angle CDE$.

Q4

(Total 2 marks)

°

.....

Q5

(Total 2 marks)

Leave blank

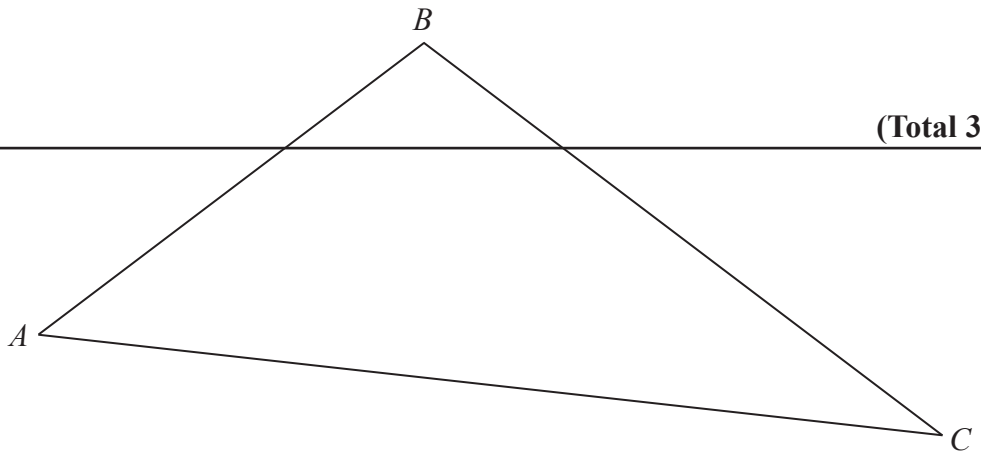
7. Given that $\mathbf{A} = \begin{pmatrix} 1 & 3 \\ 5 & -1 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} 3 & 1 & 4 \\ -4 & 3 & 1 \end{pmatrix}$, calculate the matrix product **AB**.

( )

8. Magda bought a television set and sold it to Tarek at a profit of $17\frac{1}{2}\%$.
The price which Tarek paid was £97.29.
Calculate the price, in £, Magda paid for the television set.

£ .....

9.



ABC is a triangle.

(a) Draw the line which is equidistant from sides *AB* and *AC*.

(2)

(b) Show, by shading, the region inside the triangle *ABC* of points which are closer to *AB* than to *AC*.

(1)

(Total 3 marks)

Q6

Q7

Leave blank

10. Given that $\sin x° = 0.5$ and that $90 \leqslant x \leqslant 180$, find the value of $\cos x°$.
Give your answer to 3 significant figures.

$\cos x°$ = ...

11. An unbiased standard die is to be rolled twice. Find the probability that the total of the two rolls is 3, giving your answer as a fraction.

Q12

(Total 3 marks)

.....

Q13

(Total 3 marks)

Leave blank

12. Solve the inequality

(a) $5x - 8 > 16$,

.....

(1)

(b) $7x - 22 \leqslant 5x - 8$.

.....

(2)

(Total 2 marks)

Q8

x is an integer which satisfies both the inequalities in part (a) and part (b).

(c) Write down all the possible values of x.

.....

(2)

13. A sector of area 50 cm^2 and angle 60° is cut from a circle.

(a) Caculate the radius, in cm, of the circle.
Give your answer correct to 3 significant figures.

..... cm

(3)

(Total 3 marks)

Q9

(b) Caculate the perimeter, in cm, of the sector.
Give your answer correct to 3 significant figures.

..... cm

(3)

Leave blank

14. (a) Express $\frac{7}{329}$ as a decimal to 3 significant figures.

.....

(1)

(b) Express your answer to part (a) in standard form.

.....

(1)

15. $T = 2\pi\sqrt{\left(\frac{l}{g}\right)}$

Make l the subject of the formula.

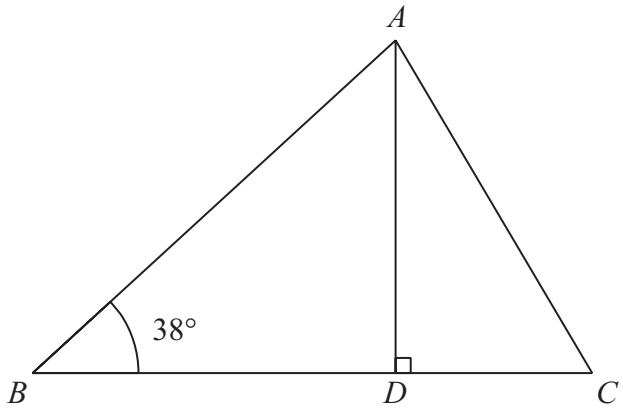
Q17

(Total 3 marks)

$l =$ .....

Leave blank

16.



In the acute angled triangle ABC, $\angle ABC = 38°$ and $BC = 15\,\text{cm}$. The area of triangle ABC is $60\,\text{cm}^2$ and D is the point on BC such that $\angle ADC = 90°$.

Calculate

(a) the length, in cm, of AD,

..... cm
(2)

Q18

(b) the length, in cm to 3 significant figures, of BD,

(Total 3 marks)

..... cm
(2)

Q19

(c) the length, in cm to 3 significant figures, of AC.

(Total 3 marks)

..... cm
(2)

Q20

(Total 4 marks)

Leave blank

17. Factorise $3x^2 - 2x - 5$

.....

18. $\mathcal{E} = \{2, 3, 4, 5, 6, 7, 8, 9\}$,

$A = \{\text{prime numbers}\}$,

$B = \{\text{odd numbers}\}$.

List the elements of

(i) $A \cap B'$,

.....

(ii) $A' \cap B$,

.....

(iii) $(A \cap B') \cup (A' \cap B)$.

.....

Q21

(Total 4 marks)

Q22

(Total 4 marks)

Leave blank

19. Given that $\mathbf{a} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$ and $\mathbf{c} = 2\mathbf{a} - 3\mathbf{b}$,

(a) find $\mathbf{c}$.

.....

20. Solve the equation $\frac{x}{4} - \frac{x+2}{5} = \frac{5}{8}$.

$x =$ .....

21. Given that $c = \sqrt{(a^2 + b^2)}$ and $a > 0$, express a in terms of b and c.
Show your working.

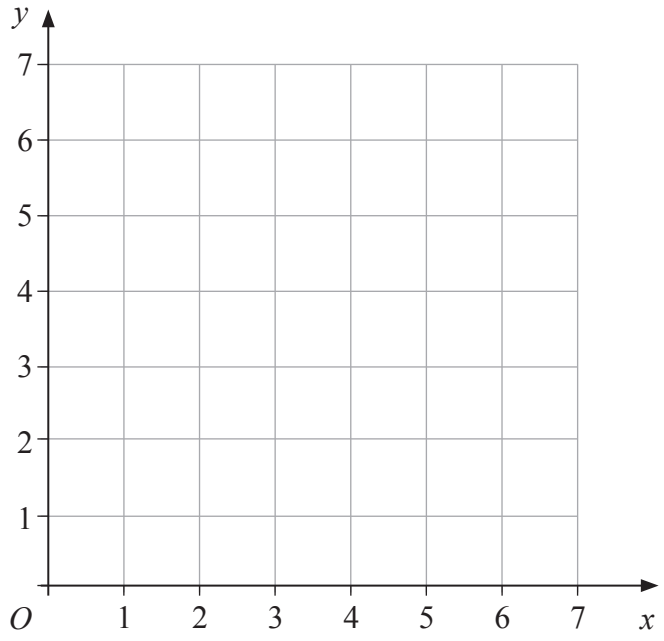
.....

Q23

(Total 4 marks)

Leave blank

22.



Q24

The point A is such that $\overrightarrow{OA} = \begin{pmatrix} 6 \\ 4 \end{pmatrix}$. **(Total 4 marks)**

(a) Mark and label A in the diagram.

(1)

(b) Calculate the magnitude of the vector $\overrightarrow{OA}$.
Give your answer correct to 3 significant figures.

.....

(2)

23. Simplify fully $\dfrac{x^2 - 5x}{x^2 - 25}$

.....

24. The six numbers 1, 7, 11, 19, 30 and x have a mean of $3x$.
Work out the value of x.

Q25

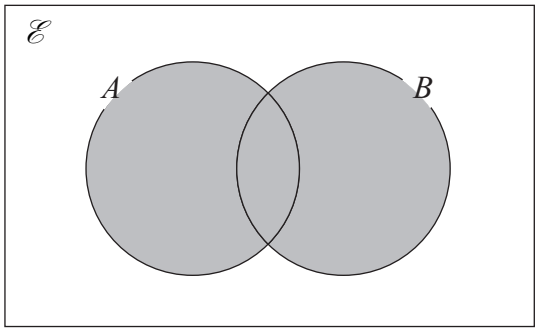
(Total 4 marks)

$x =$ .....

Leave blank

25. Describe, in set notation, the region shaded in each Venn diagram.

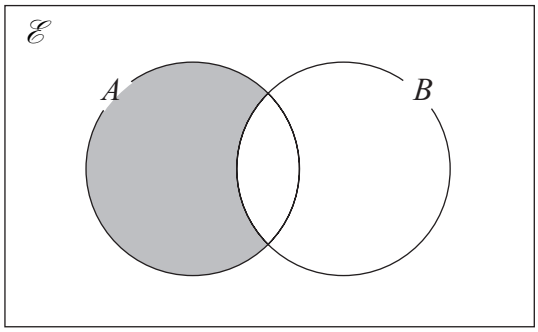
(a)



.....

(1)

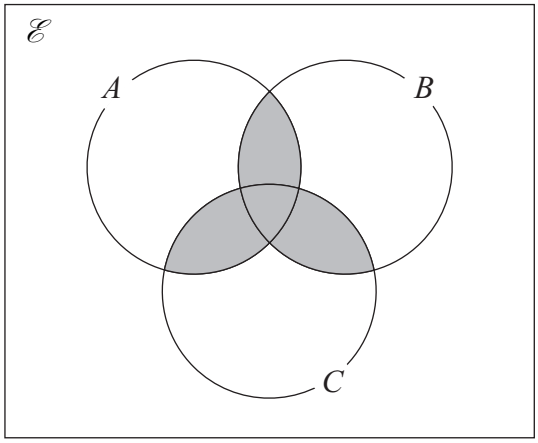
(b)



.....

(1)

(c)



.....

(1)

Q26

(Total 5 marks)

Leave blank

26. $y = x^4 - 2x^{-4}$

Find $\frac{dy}{dx}$.

$\frac{dy}{dx}$ = ...

27. The volume of a sphere varies directly as the cube of its radius. The volume of a sphere of radius r is V.
Find the radius R, in terms of r, of a sphere with volume $64V$.

R = ...

Q27

(Total 5 marks)

Leave blank

28. A and B are two similar solids with volumes 48 cm^3 and 2058 cm^3 respectively.
The length of one side of B is 21 cm.
Calculate the length, in cm, of the corresponding side of A.

..... cm

Q28

(Total 5 marks)

Q29

(Total 6 marks)

Leave blank

29.

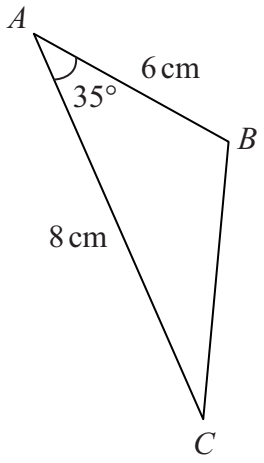


Diagram **NOT** accurately drawn

In triangle ABC, $AB = 6$ cm, $AC = 8$ cm and $\angle BAC = 35°$.

Calculate, to 3 significant figures,

(a) the length of BC,

..... cm

(3)

(b) the size of $\angle ACB$.

°

.....

(3)

30. A particle is moving in a straight line through O.
The displacement s of the particle from O at time t seconds ($t \geqslant 0$) is given by
$s = t^3 - 27t + 2$.
Find the value of t when the velocity of the particle is zero.

$t =$ .....

Q30

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

END

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