UNIVERSITY of CAMBRIDGE
International Examinations

Cambridge IGCSE

SYLLABUS

Cambridge IGCSE®
Additional Mathematics
0606

For examination in June and November 2014

Contents

1. Introduction

1.1 Why choose Cambridge?

University of Cambridge International Examinations is the world's largest provider of international education programmes and qualifications for 5 to 19 year olds. We are part of the University of Cambridge, trusted for excellence in education. Our qualifications are recognised by the world's universities and employers.

Recognition

Every year, hundreds of thousands of learners gain the Cambridge qualifications they need to enter the world's universities.

Cambridge IGCSE® (International General Certificate of Secondary Education) is internationally recognised by schools, universities and employers as equivalent to UK GCSE. Learn more at **www.cie.org.uk/recognition**

Excellence in education

We understand education. We work with over 9000 schools in over 160 countries who offer our programmes and qualifications. Understanding learners' needs around the world means listening carefully to our community of schools, and we are pleased that 98% of Cambridge schools say they would recommend us to other schools.

Our mission is to provide excellence in education, and our vision is that Cambridge learners become confident, responsible, innovative and engaged.

Cambridge programmes and qualifications help Cambridge learners to become:

- **confident** in working with information and ideas – their own and those of others
- **responsible** for themselves, responsive to and respectful of others
- **innovative** and equipped for new and future challenges
- **engaged** intellectually and socially, ready to make a difference.

Support in the classroom

We provide a world-class support service for Cambridge teachers and exams officers. We offer a wide range of teacher materials to Cambridge schools, plus teacher training (online and face-to-face), expert advice and learner-support materials. Exams officers can trust in reliable, efficient administration of exams entry and excellent, personal support from our customer services. Learn more at **www.cie.org.uk/teachers**

Not-for-profit, part of the University of Cambridge

We are a part of Cambridge Assessment, a department of the University of Cambridge and a not-for-profit organisation.

We invest constantly in research and development to improve our programmes and qualifications.

1.2 Why choose Cambridge IGCSE?

Cambridge IGCSE helps your school improve learners' performance. Learners develop not only knowledge and understanding, but also skills in creative thinking, enquiry and problem solving, helping them to perform well and prepare for the next stage of their education.

Cambridge IGCSE is the world's most popular international curriculum for 14 to 16 year olds, leading to globally recognised and valued Cambridge IGCSE qualifications. It is part of the Cambridge Secondary 2 stage.

Schools worldwide have helped develop Cambridge IGCSE, which provides an excellent preparation for Cambridge International AS and A Levels, Cambridge Pre-U, Cambridge AICE (Advanced International Certificate of Education) and other education programmes, such as the US Advanced Placement Program and the International Baccalaureate Diploma. Cambridge IGCSE incorporates the best in international education for learners at this level. It develops in line with changing needs, and we update and extend it regularly.

1.3 Why choose Cambridge IGCSE Additional Mathematics?

Cambridge IGCSE Additional Mathematics is accepted by universities and employers as proof of essential mathematical knowledge and ability.

The Additional Mathematics syllabus is intended for high ability candidates who have achieved, or are likely to achieve, Grade A*, A or B in the Cambridge IGCSE Mathematics examination.

Successful Cambridge IGCSE Additional Mathematics candidates gain lifelong skills, including:

- the further development of mathematical concepts and principles
- the extension of mathematical skills and their use in more advanced techniques
- an ability to solve problems, present solutions logically and interpret results
- a solid foundation for further study.

1.4 Cambridge International Certificate of Education (ICE)

Cambridge ICE is the group award of Cambridge IGCSE. It gives schools the opportunity to benefit from offering a broad and balanced curriculum by recognising the achievements of learners who pass examinations in at least seven subjects. Learners draw subjects from five subject groups, including two languages, and one subject from each of the other subject groups. The seventh subject can be taken from any of the five subject groups.

Additional Mathematics (0606) falls into Group IV, Mathematics.

Learn more about Cambridge IGCSE and Cambridge ICE at **www.cie.org.uk/cambridgesecondary2**

1.5 How can I find out more?

If you are already a Cambridge school

You can make entries for this qualification through your usual channels. If you have any questions, please contact us at **international@cie.org.uk**

If you are not yet a Cambridge school

Learn about the benefits of becoming a Cambridge school at **www.cie.org.uk/startcambridge**.
Email us at **international@cie.org.uk** to find out how your organisation can become a Cambridge school.

2. Assessment at a glance

All candidates will take two written papers.

The syllabus content will be assessed by Paper 1 and Paper 2.

Paper	Duration	Marks
Paper 1 10–12 questions of various lengths No choice of question.	2 hours	80
Paper 2 10–12 questions of various lengths No choice of question.	2 hours	80

Grades A* to E will be available for candidates who achieve the required standards. Since there is no Core Curriculum for this syllabus, Grades F and G will not be available. Therefore, candidates who do not achieve the minimum mark for Grade E will be unclassified.

Calculators

The syllabus assumes that candidates will be in possession of an electronic calculator with scientific functions for both papers.

Non-exact numerical answers will be required to be given correct to three significant figures, or one decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.

List of formulae

Relevant mathematical formulae will be provided on the inside covers of the question papers.

Availability

This syllabus is examined in the May/June examination series and the October/November examination series.

This syllabus is available to private candidates.

Centres in the UK that receive government funding are advised to consult the Cambridge website **www.cie.org.uk** for the latest information before beginning to teach this syllabus.

Combining this with other syllabuses

Candidates can combine this syllabus in an examination series with any other Cambridge syllabus, except:

- syllabuses with the same title at the same level
- 4037 Additional Mathematics

Please note that Cambridge IGCSE, Cambridge International Level 1/Level 2 Certificates and Cambridge O Level syllabuses are at the same level.

3. Syllabus aims and objectives

3.1 Aims

The aims of the syllabus listed below are not in order of priority.

The aims are to enable candidates to:

- consolidate and extend their elementary mathematical skills, and use these in the context of more advanced techniques
- further develop their knowledge of mathematical concepts and principles, and use this knowledge for problem solving
- appreciate the interconnectedness of mathematical knowledge
- acquire a suitable foundation in mathematics for further study in the subject or in mathematics related subjects
- devise mathematical arguments and use and present them precisely and logically
- integrate information technology (IT) to enhance the mathematical experience
- develop the confidence to apply their mathematical skills and knowledge in appropriate situations
- develop creativity and perseverance in the approach to problem solving
- derive enjoyment and satisfaction from engaging in mathematical pursuits, and gain an appreciation of the beauty, power and usefulness of mathematics.

3.2 Assessment objectives

The examination will test the ability of candidates to:

- recall and use manipulative technique
- interpret and use mathematical data, symbols and terminology
- comprehend numerical, algebraic and spatial concepts and relationships
- recognise the appropriate mathematical procedure for a given situation
- formulate problems into mathematical terms and select and apply appropriate techniques of solution.

Any of the above objectives can be assessed in any question in Papers 1 and 2.

4. Syllabus content

The Additional Mathematics syllabus is intended for high ability candidates who have achieved, or are likely to achieve Grade A*, A or B in the Cambridge IGCSE Mathematics examination. The curriculum objectives are therefore assessed at one level only (Extended). As for Extended level syllabuses in other subjects, Grades A* to E will be available.

The Curriculum objectives (Core and Supplement) for Cambridge IGCSE Mathematics will be assumed as prerequisite knowledge.

Proofs of standard results will not be required unless specifically mentioned below.

Candidates will be expected to be familiar with the scientific notation for the expression of compound units, e.g. 5 m s^{-1} for 5 metres per second.

Theme or topic	Curriculum objectives
	Candidates should be able to:
1. Set language and notation	• use set language and notation, and Venn diagrams to describe sets and represent relationships between sets as follows: $A = \{x: x \text{ is a natural number}\}$ $B = \{(x, y): y = mx + c\}$ $C = \{x: a \leqslant x \leqslant b\}$ $D = \{a, b, c, \ldots\}$ • understand and use the following notation: Union of A and B — $A \cup B$ Intersection of A and B — $A \cap B$ Number of elements in set A — $n(A)$ "…is an element of…" — $\in$ "…is not an element of…" — $\notin$ Complement of set A — A' The empty set — $\varnothing$ Universal set — $\mathscr{E}$ A is a subset of B — $A \subseteq B$ A is a proper subset of B — $A \subset B$ A is not a subset of B — $A \nsubseteq B$ A is not a proper subset of B — $A \not\subset B$

Theme or topic	Curriculum objectives
2. Functions	• understand the terms: function, domain, range (image set), one-one function, inverse function and composition of functions • use the notation $f(x) = \sin x$, $f: x \mapsto \lg x$ $(x > 0)$, $f^{-1}(x)$ and $f^2(x)$ $[= f(f(x))]$ • understand the relationship between $y = f(x)$ and $y = \lvert f(x) \rvert$, where $f(x)$ may be linear, quadratic or trigonometric • explain in words why a given function is a function or why it does not have an inverse • find the inverse of a one-one function and form composite functions • use sketch graphs to show the relationship between a function and its inverse
3. Quadratic functions	• find the maximum or minimum value of the quadratic function $f: x \mapsto ax^2 + bx + c$ by any method • use the maximum or minimum value of $f(x)$ to sketch the graph or determine the range for a given domain • know the conditions for $f(x) = 0$ to have: (i) two real roots, (ii) two equal roots, (iii) no real roots and the related conditions for a given line to (i) intersect a given curve, (ii) be a tangent to a given curve, (iii) not intersect a given curve • solve quadratic equations for real roots and find the solution set for quadratic inequalities
4. Indices and surds	• perform simple operations with indices and with surds, including rationalising the denominator
5. Factors of polynomials	• know and use the remainder and factor theorems • find factors of polynomials • solve cubic equations
6. Simultaneous equations	• solve simultaneous equations in two unknowns with at least one linear equation
7. Logarithmic and exponential functions	• know simple properties and graphs of the logarithmic and exponential functions including $\ln x$ and e^x (series expansions are not required) • know and use the laws of logarithms (including change of base of logarithms) • solve equations of the form $a^x = b$

Theme or topic	Curriculum objectives
8. Straight line graphs	• interpret the equation of a straight line graph in the form $y = mx + c$ • transform given relationships, including $y = ax^n$ and $y = Ab^x$, to straight line form and hence determine unknown constants by calculating the gradient or intercept of the transformed graph • solve questions involving mid-point and length of a line • know and use the condition for two lines to be parallel or perpendicular
9. Circular measure	• solve problems involving the arc length and sector area of a circle, including knowledge and use of radian measure
10. Trigonometry	• know the six trigonometric functions of angles of any magnitude (sine, cosine, tangent, secant, cosecant, cotangent) • understand amplitude and periodicity and the relationship between graphs of e.g. $\sin x$ and $\sin 2x$ • draw and use the graphs of $y = a \sin(bx) + c$ $y = a \cos(bx) + c$ $y = a \tan(bx) + c$ where a and b are positive integers and c is an integer • use the relationships $\frac{\sin A}{\cos A} = \tan A$, $\frac{\cos A}{\sin A} = \cot A$, $\sin^2 A + \cos^2 A = 1$, $\sec^2 A = 1 + \tan^2 A$, $\operatorname{cosec}^2 A = 1 + \cot^2 A$ and solve simple trigonometric equations involving the six trigonometric functions and the above relationships (not including general solution of trigonometric equations) • prove simple trigonometric identities
11. Permutations and combinations	• recognise and distinguish between a permutation case and a combination case • know and use the notation $n!$ (with $0! = 1$), and the expressions for permutations and combinations of n items taken r at a time • answer simple problems on arrangement and selection (cases with repetition of objects, or with objects arranged in a circle or involving both permutations and combinations, are excluded)
12. Binomial expansions	• use the Binomial Theorem for expansion of $(a + b)^n$ for positive integral n • use the general term $\binom{n}{r} a^{n-r} b^r$, $0 < r \leqslant n$ (knowledge of the greatest term and properties of the coefficients is not required)

Theme or topic	Curriculum objectives
13. Vectors in 2 dimensions	• use vectors in any form, e.g. $\begin{pmatrix} a \\ b \end{pmatrix}$, $\overrightarrow{AB}$, $\mathbf{p}$, $a\mathbf{i} - b\mathbf{j}$ • know and use position vectors and unit vectors • find the magnitude of a vector; add and subtract vectors and multiply vectors by scalars • compose and resolve velocities • use relative velocity, including solving problems on interception (but not closest approach)
14. Matrices	• display information in the form of a matrix of any order and interpret the data in a given matrix • solve problems involving the calculation of the sum and product (where appropriate) of two matrices and interpret the results • calculate the product of a scalar quantity and a matrix • use the algebra of 2 × 2 matrices (including the zero and identity matrix) • calculate the determinant and inverse of a non-singular 2 × 2 matrix and solve simultaneous linear equations
15. Differentiation and integration	• understand the idea of a derived function • use the notations $f'(x)$, $f''(x)$, $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$, $\left[= \frac{d}{dx}\left(\frac{dy}{dx}\right)\right]$ • use the derivatives of the standard functions x^n (for any rational n), $\sin x$, $\cos x$, $\tan x$, e^x, $\ln x$, together with constant multiples, sums and composite functions of these • differentiate products and quotients of functions • apply differentiation to gradients, tangents and normals, stationary points, connected rates of change, small increments and approximations and practical maxima and minima problems • discriminate between maxima and minima by any method • understand integration as the reverse process of differentiation • integrate sums of terms in powers of x, excluding $\frac{1}{x}$ • integrate functions of the form $(ax + b)^n$ (excluding $n = -1$), e^{ax+b}, $\sin(ax + b)$, $\cos(ax + b)$ • evaluate definite integrals and apply integration to the evaluation of plane areas • apply differentiation and integration to kinematics problems that involve displacement, velocity and acceleration of a particle moving in a straight line with variable or constant acceleration, and the use of x-t and v-t graphs

5. Mathematical notation

The list which follows summarises the notation used in the Cambridge's Mathematics examinations. Although primarily directed towards Advanced/HSC (Principal) level, the list also applies, where relevant, to examinations at Cambridge O Level/S.C.

Mathematical Notation

1. Set Notation

$\in$	is an element of
$\notin$	is not an element of
$\{x_1, x_2, \ldots\}$	the set with elements x_1, x_2, …
$\{x: \ldots\}$	the set of all x such that…
$\mathrm{n}(A)$	the number of elements in set A
$\varnothing$	the empty set
$\mathscr{E}$	universal set
A'	the complement of the set A
$\mathbb{N}$	the set of natural numbers, {1, 2, 3, …}
$\mathbb{Z}$	the set of integers {0, ±1, ±2, ±3, …}
$\mathbb{Z}^+$	the set of positive integers {1, 2, 3, …}
$\mathbb{Z}_n$	the set of integers modulo n, {0, 1, 2, …, n – 1}
$\mathbb{Q}$	the set of rational numbers
$\mathbb{Q}^+$	the set of positive rational numbers, $\{x \in \mathbb{Q}: x > 0\}$
$\mathbb{Q}_0^+$	the set of positive rational numbers and zero, $\{x \in \mathbb{Q}: x \geqslant 0\}$
$\mathbb{R}$	the set of real numbers
$\mathbb{R}^+$	the set of positive real numbers $\{x \in \mathbb{R}: x > 0\}$
$\mathbb{R}_0^+$	the set of positive real numbers and zero $\{x \in \mathbb{R}: x \geqslant 0\}$
$\mathbb{R}^n$	the real n tuples
$\mathbb{C}$	the set of complex numbers
$\subseteq$	is a subset of
$\subset$	is a proper subset of
$\not\subseteq$	is not a subset of
$\not\subset$	is not a proper subset of
$\cup$	union
$\cap$	intersection
$[a, b]$	the closed interval $\{x \in \mathbb{R}: a \leqslant x \leqslant b\}$
$[a, b)$	the interval $\{x \in \mathbb{R}: a \leqslant x < b\}$
$(a, b]$	the interval $\{x \in \mathbb{R}: a < x \leqslant b\}$
(a, b)	the open interval $\{x \in \mathbb{R}: a < x < b\}$
yRx	y is related to x by the relation R
$y \sim x$	y is equivalent to x, in the context of some equivalence relation

2. Miscellaneous Symbols

$=$	is equal to
$\neq$	is not equal to
$\equiv$	is identical to or is congruent to
$\approx$	is approximately equal to
$\cong$	is isomorphic to
$\propto$	is proportional to
$<$; $\ll$	is less than, is much less than
$\leqslant$, $\not>$	is less than or equal to, is not greater than
$>$; $\gg$	is greater than, is much greater than
$\geqslant$, $\not<$	is greater than or equal to, is not less than
∞	infinity

3. Operations

$a + b$	a plus b
$a - b$	a minus b
$a \times b$, ab, $a.b$	a multiplied by b
$a \div b$, $\frac{a}{b}$, a/b	a divided by b
$a : b$	the ratio of a to b
$\sum_{i=1}^{n} a_i$	$a_1 + a_2 + \ldots + a_n$
$\sqrt{a}$	the positive square root of the real number a
$\lvert a \rvert$	the modulus of the real number a
$n!$	n factorial for $n \in \mathbb{N}$ $(0! = 1)$
$\binom{n}{r}$	the binomial coefficient $\frac{n!}{r!(n-r)!}$, for $n, r \in \mathbb{N}$, $0 \leqslant r \leqslant n$
	$\frac{n(n-1)\ldots(n-r+1)}{r!}$, for $n \in \mathbb{Q}$, $r \in \mathbb{N}$

4. Functions

f	function f
$\mathrm{f}(x)$	the value of the function f at x
$\mathrm{f}: A \to B$	f is a function under which each element of set A has an image in set B
$\mathrm{f}: x \mapsto y$	the function f maps the element x to the element y
f^{-1}	the inverse of the function f
$\mathrm{g} \circ \mathrm{f}$, gf	the composite function of f and g which is defined by $(\mathrm{g} \circ \mathrm{f})(x)$ or $\mathrm{gf}(x) = \mathrm{g}(\mathrm{f}(x))$
$\lim_{x \to a} \mathrm{f}(x)$	the limit of $\mathrm{f}(x)$ as x tends to a
$\Delta x; \delta x$	an increment of x
$\frac{\mathrm{d}y}{\mathrm{d}x}$	the derivative of y with respect to x
$\frac{\mathrm{d}^n y}{\mathrm{d}x^n}$	the nth derivative of y with respect to x
$\mathrm{f}'(x)$, $\mathrm{f}''(x)$, …, $\mathrm{f}^{(n)}(x)$	the first, second, …, nth derivatives of $\mathrm{f}(x)$ with respect to x
$\int y \mathrm{d}x$	indefinite integral of y with respect to x
$\int_a^b y \, \mathrm{d}x$	the definite integral of y with respect to x for values of x between a and b
$\frac{\partial y}{\partial x}$	the partial derivative of y with respect to x
$\dot{x}$, $\ddot{x}$, …	the first, second, … derivatives of x with respect to time

5. Exponential and Logarithmic Functions

e	base of natural logarithms
e^x, $\exp x$	exponential function of x
$\log_a x$	logarithm to the base a of x
$\ln x$	natural logarithm of x
$\lg x$	logarithm of x to base 10

6. Circular and Hyperbolic Functions and Relations

$\sin, \cos, \tan, \operatorname{cosec}, \sec, \cot$	the circular functions
$\sin^{-1}, \cos^{-1}, \tan^{-1}, \operatorname{cosec}^{-1}, \sec^{-1}, \cot^{-1}$	the inverse circular relations
$\sinh, \cosh, \tanh, \operatorname{cosech}, \operatorname{sech}, \coth$	the hyperbolic functions
$\sinh^{-1}, \cosh^{-1}, \tanh^{-1}, \operatorname{cosech}^{-1}, \operatorname{sech}^{-1}, \coth^{-1}$	the inverse hyperbolic relations

7. Complex Numbers

i	square root of -1
z	a complex number, $z = x + \mathrm{i}y$ $= r(\cos\theta + \mathrm{i}\sin\theta),\ r \in \mathbb{R}_0^+$ $= re^{i\theta},\ r \in \mathbb{R}_0^+$
$\mathrm{Re}\ z$	the real part of z, $\mathrm{Re}(x + \mathrm{i}y) = x$
$\mathrm{Im}\ z$	the imaginary part of z, $\mathrm{Im}(x + \mathrm{i}y) = y$
$\lvert z \rvert$	the modulus of z, $\lvert x + \mathrm{i}y \rvert = \sqrt{(x^2 + y^2)}$, $\lvert r(\cos\theta + \mathrm{i}\sin\theta) \rvert = r$
$\arg z$	the argument of z, $\arg(r(\cos\theta + \mathrm{i}\sin\theta)) = \theta, -\pi < \theta \leqslant \pi$
z^*	the complex conjugate of z, $(x + \mathrm{i}y)^* = x - \mathrm{i}y$

8. Matrices

$\mathbf{M}$	a matrix $\mathbf{M}$
$\mathbf{M}^{-1}$	the inverse of the square matrix $\mathbf{M}$
$\mathbf{M}^{\mathrm{T}}$	the transpose of the matrix $\mathbf{M}$
$\det \mathbf{M}$	the determinant of the square matrix $\mathbf{M}$

9. Vectors

$\mathbf{a}$	the vector $\mathbf{a}$
$\overrightarrow{AB}$	the vector represented in magnitude and direction by the directed line segment AB
$\hat{\mathbf{a}}$	a unit vector in the direction of the vector $\mathbf{a}$
$\mathbf{i}, \mathbf{j}, \mathbf{k}$	unit vectors in the directions of the cartesian coordinate axes
$\lvert \mathbf{a} \rvert$	the magnitude of $\mathbf{a}$
$\lvert \overrightarrow{AB} \rvert$	the magnitude of $\overrightarrow{AB}$
$\mathbf{a} \cdot \mathbf{b}$	the scalar product of $\mathbf{a}$ and $\mathbf{b}$
$\mathbf{a} \times \mathbf{b}$	the vector product of $\mathbf{a}$ and $\mathbf{b}$

10. Probability and Statistics

A, B, C etc.	events
$A \cup B$	union of events A and B
$A \cap B$	intersection of the events A and B
$\mathrm{P}(A)$	probability of the event A
A'	complement of the event A, the event 'not A'
$\mathrm{P}(A\|B)$	probability of the event A given the event B
X, Y, R, etc.	random variables
x, y, r, etc.	values of the random variables X, Y, R, etc.
$x_1, x_2, \ldots$	observations
$f_1, f_2, \ldots$	frequencies with which the observations $x_1, x_2, \ldots$ occur
$\mathrm{p}(x)$	the value of the probability function $\mathrm{P}(X = x)$ of the discrete random variable X
$p_1, p_2, \ldots$	probabilities of the values $x_1, x_2, \ldots$ of the discrete random variable X
$\mathrm{f}(x), \mathrm{g}(x), \ldots$	the value of the probability density function of the continuous random variable X
$\mathrm{F}(x), \mathrm{G}(x), \ldots$	the value of the (cumulative) distribution function $\mathrm{P}(X \leqslant x)$ of the random variable X
$\mathrm{E}(X)$	expectation of the random variable X
$\mathrm{E}[\mathrm{g}(X)]$	expectation of $\mathrm{g}(X)$
$\mathrm{Var}(X)$	variance of the random variable X
$\mathrm{G}(t)$	the value of the probability generating function for a random variable which takes integer values
$\mathrm{B}(n, p)$	binomial distribution, parameters n and p
$\mathrm{Po}(\mu)$	Poisson distribution, mean μ
$\mathrm{N}(\mu, \sigma^2)$	normal distribution, mean μ and variance σ^2
μ	population mean
σ^2	population variance
σ	population standard deviation
$\bar{x}$	sample mean
s^2	unbiased estimate of population variance from a sample, $s^2 = \frac{1}{n-1}\sum(x - \bar{x})^2$
ϕ	probability density function of the standardised normal variable with distribution $\mathrm{N}(0, 1)$
Φ	corresponding cumulative distribution function
ρ	linear product-moment correlation coefficient for a population
r	linear product-moment correlation coefficient for a sample
$\mathrm{Cov}(X, Y)$	covariance of X and Y

6. Additional information

6.1 Guided learning hours

Cambridge IGCSE syllabuses are designed on the assumption that candidates have about 130 guided learning hours per subject over the duration of the course. ('Guided learning hours' include direct teaching and any other supervised or directed study time. They do not include private study by the candidate.)

However, this figure is for guidance only, and the number of hours required may vary according to local curricular practice and the candidates' prior experience of the subject.

6.2 Recommended prior learning

We recommend that candidates who are beginning this course should be currently studying or have previously studied Cambridge IGCSE or Cambridge O Level Mathematics.

6.3 Progression

Cambridge IGCSE Certificates are general qualifications that enable candidates to progress either directly to employment, or to proceed to further qualifications.

Candidates who are awarded grades C to A* in Cambridge IGCSE Additional Mathematics are well prepared to follow courses leading to Cambridge International AS and A Level Mathematics, or the equivalent.

6.4 Component codes

Because of local variations, in some cases component codes will be different in instructions about making entries for examinations and timetables from those printed in this syllabus, but the component names will be unchanged to make identification straightforward.

6.5 Grading and reporting

Cambridge IGCSE results are shown by one of the grades A*, A, B, C, D or E indicating the standard achieved, Grade A* being the highest and Grade G the lowest. 'Ungraded' indicates that the candidate's performance fell short of the standard required for Grade G. 'Ungraded' will be reported on the statement of results but not on the certificate.

Percentage uniform marks are also provided on each candidate's statement of results to supplement their grade for a syllabus. They are determined in this way:

- A candidate who obtains…
  … the minimum mark necessary for a Grade A* obtains a percentage uniform mark of 90%.
  … the minimum mark necessary for a Grade A obtains a percentage uniform mark of 80%.
  … the minimum mark necessary for a Grade B obtains a percentage uniform mark of 70%.
  … the minimum mark necessary for a Grade C obtains a percentage uniform mark of 60%.

… the minimum mark necessary for a Grade D obtains a percentage uniform mark of 50%.

… the minimum mark necessary for a Grade E obtains a percentage uniform mark of 40%.

… no marks receives a percentage uniform mark of 0%.

Candidates whose mark is none of the above receive a percentage mark in between those stated, according to the position of their mark in relation to the grade 'thresholds' (i.e. the minimum mark for obtaining a grade). For example, a candidate whose mark is halfway between the minimum for a Grade C and the minimum for a Grade D (and whose grade is therefore D) receives a percentage uniform mark of 55%.

The percentage uniform mark is stated at syllabus level only. It is not the same as the 'raw' mark obtained by the candidate, since it depends on the position of the grade thresholds (which may vary from one series to another and from one subject to another) and it has been turned into a percentage.

6.6 Access

Reasonable adjustments are made for disabled candidates in order to enable them to access the assessments and to demonstrate what they know and what they can do. For this reason, very few candidates will have a complete barrier to the assessment. Information on reasonable adjustments is found in the *Cambridge Handbook* which can be downloaded from the website **www.cie.org.uk**

Candidates who are unable to access part of the assessment, even after exploring all possibilities through reasonable adjustments, may still be able to receive an award based on the parts of the assessment they have taken.

6.7 Support and resources

Copies of syllabuses, the most recent question papers and Principal Examiners' reports for teachers are on the Syllabus and Support Materials CD-ROM, which we send to all Cambridge International Schools. They are also on our public website – go to **www.cie.org.uk/igcse**. Click the **Subjects** tab and choose your subject. For resources, click 'Resource List'.

You can use the 'Filter by' list to show all resources or only resources categorised as 'Endorsed by Cambridge'. Endorsed resources are written to align closely with the syllabus they support. They have been through a detailed quality-assurance process. As new resources are published, we review them against the syllabus and publish their details on the relevant resource list section of the website.

Additional syllabus-specific support is available from our secure Teacher Support website **http://teachers.cie.org.uk** which is available to teachers at registered Cambridge schools. It provides past question papers and examiner reports on previous examinations, as well as any extra resources such as schemes of work or examples of candidate responses. You can also find a range of subject communities on the Teacher Support website, where Cambridge teachers can share their own materials and join discussion groups.

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