Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/43**

Paper 4 (Extended) **May/June 2018**

MARK SCHEME

Maximum Mark: 120

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

IGCSE™ is a registered trademark.

© UCLES 2018

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

© UCLES 2018

MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method marks, awarded for a valid method applied to the problem.

A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation '**dep**' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

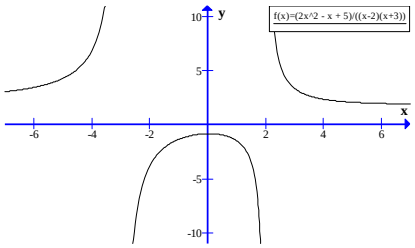
Abbreviations

awrt	answers which round to
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
nfww	not from wrong working
oe	or equivalent
rot	rounded or truncated
SC	Special Case
soi	seen or implied

© UCLES 2018

Question	Answer	Marks	Partial Marks
1(a)	10	**1**	
1(b)	6 nfww	**2**	**B1** for 17 or 11 seen
1(c)	10	**1**	
1(d)	15	**1**	
1(e)	14.5 or 14.51 to 14.52	**2**	**M1** for Σxf soi by e.g. 450
1(f)	It is the smallest oe	**1**	
2(a)	30.51	**2**	**M1** for $22.6 \times \left(1+\frac{35}{100}\right)$ oe
2(b)	40.9 or 40.93 to 40.94	**3**	**M2** for $\frac{43-\textit{their}\ 30.51}{\textit{their}\ 30.51}$ [× 100] oe or **M1** for 43 – *their* 30.51 or $\frac{43}{\textit{their}\ 30.51}$
2(c)	80	**3**	**M2** for $92 \div \left(1+\frac{15}{100}\right)$ oe or **M1** for 92 = 115% oe
2(d)	7 nfww	**3**	**M2** for $\frac{\log(\frac{32}{45})}{\log 0.95}$ soi by 6.64 to 6.65 or trials as far as $n = 5$ or **M1** for 45×0.95^n oe soi
3(a)	Triangle at (4, –4), (5, –4), (5, –6)	**2**	**B1** for translation $\begin{pmatrix}3\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-1\end{pmatrix}$
3(b)	Triangle at (5, 0), (7, 0), (7, 3)	**2**	**B1** for any stretch in with *x*-axis invariant or correct stretch translated vertically
3(c)	Rotation 90° clockwise oe (3, –1)	**3**	**B1** for each
4(a)	6 points plotted correctly	**3**	**B2** for 4 or 5 correct or **B1** for 2 or 3 correct
4(b)(i)	Negative	**1**	
4(b)(ii)	D	**1**	

© UCLES 2018

Question	Answer	Marks	Partial Marks
4(c)(i)	$p = -967d + 6300$	**2**	or $(-967.4$ to $-967.3)d + 6297$ to 6298 or **B1** for $-967d + k$ or $kd + 6300$
4(c)(ii)	3980 or 4000 or 3975 to 3980	**1**	**FT**
4(c)(iii)	[Too] far outside range of data oe	**1**	
5(a)	Correct sketch 	**3**	**B1** for each branch
5(b)	(0.0295, – 0.833)	**2**	or (0.02948 to 0.02949, –0.8329...) **B1** for each
5(c)	$x = -3$, $x = 2$, $y = 2$	**3**	**B1** for each
5(d)	$-0.833 < k \leqslant 2$	**2**	**FT** *their* **(b)** **B1** for each inequality
5(e)(i)	–5.13, 2.81	**2**	–5.131..., 2.812 to 2.813 **B1** for each
5(e)(ii)	$-5.13 < x < -3$, $2 < x < 2.81$	**2**	–5.131..., 2.812 to 2.813 **B1** for each **FT** *their* **(c)** and **(e)(i)**
6(a)	$\begin{pmatrix} 72.5 \text{ or } 72.50... \\ 33.8 \text{ or } 33.80 \text{ to } 33.81 \end{pmatrix}$	**4**	**B2** for 72.5 or 72.50... or **M1** for $\frac{[...]}{80} = \sin 65$ oe seen (80sin65 oe) **B2** for 33.8 or 33.80 to 33.81 or **M1** for $\frac{[...]}{80} = \cos 65$ oe seen (80cos65 oe)
6(b)	$\begin{pmatrix} 187 \text{ or } 187.1 \text{ to } 187.2 \\ -46.5 \text{ or } -46.49... \end{pmatrix}$	**5**	**M2** for *their* 72.5 + 140cos35 oe or **M1** for $\frac{[...]}{140} = \cos 35$ oe seen (140cos35 oe) **M2** for *their* 33.8 – 140sin35 oe or **M1** for $\frac{[...]}{140} = \sin 35$ oe seen (140 sin35 oe)
6(c)(i)	(*their* 187)^2 + (*their*[–] 46.5)^2	**M1**	
	193 or 192.6 to 192.9	**B1**	

Question	Answer	Marks	Partial Marks
6(c)(ii)	$\tan[x] = \frac{\textit{their}\ 46.5}{\textit{their}\ 187}$ oe soi by 13.9...	**M1**	
	284 or 283.9 to 284.0	**B2**	**M1** for 270 + *their x* oe
7(a)	0.278 or 0.2781 to 0.2782	**3**	**M2** for $0.5 \times 0.6 \times 0.8 \times \sin 105 \times 1.2$ oe or **M1** for $0.5 \times 0.6 \times 0.8 \times \sin 105$
7(b)	3.48 to 3.49	**5**	**M2** for $\sqrt{0.6^2 + 0.8^2 - 2 \times 0.6 \times 0.8 \times \cos 105}$ or **M1** for $0.6^2 + 0.8^2 - 2 \times 0.6 \times 0.8 \times \cos 105$ **A1** for 1.12 or 1.117... **M1** for *their* 1.117 × 1.2+ 2 × *their* area of *ABC* + 0.6 × 0.12 + 0.8 × 1.2
7(c)	0.0348 to 0.0349	**3**	**FT** *their* **(b)** ÷ 100 **M2** for *their* **(b)** $\div \sqrt[3]{\frac{2170}{2.17}} \times \left(\sqrt[3]{\frac{2170}{2.17}}\right)^2$ oe or **M1** for $\frac{2170}{2.17}$ or $\frac{2.17}{2170}$ or $\left(\sqrt[3]{k}\right)^2$ implied by *their* **(b)** ÷ 1000
8(a)	Fully correct tree diagram	**3**	**B1** for each column correct of 0.9 and 0.1 correctly placed (L &R) 0.8 and 0.2 correctly placed (S) 0.7 and 0.3 correctly placed (W)
8(b)	0.504	**2**	**M1** for 0.9 × 0.8 × 0.7
8(c)	0.398	**4**	**M3** for 0.9 × 0.8 × 0.3 + 0.9 × 0.2 × 0.7 + 0.1 × 0.8 × 0.7 or **M2** for 2 of above products or **M1** for 1 of above products
9(a)	25 25 16 36 25 41 61	**3**	**B1** for each row
9(b)(i)	225 196	**2**	**B1** for each
9(b)(ii)	361 400	**2**	**B1** for each
9(c)	$n^2 + (n-1)^2$ oe	**2**	**M1** for 2nd differences all 4 or quadratic expression

Question	Answer	Marks	Partial Marks
10(a)	$\frac{930}{x}$	**1**	
10(b)(i)	$\frac{930}{x} - \frac{930}{x+5}$ soi	**M1**	
	$1860(x + 5) – 1860x = x(x + 5)$ oe	**M1**	**FT** dep on 1st M1with $\frac{1}{2}$ as separate term in equation
	Completion to $x^2 + 5x – 9300 = 0$ with no errors	**A1**	
10(b)(ii)	94[.0] or 93.96 to 93.97 –99[.0] or –98.97 to –98.96	**3**	**M1** for $\frac{5 \pm \sqrt{5^2 – 4(1)(–9300)}}{2}$ or sketch of parabola **B1** for 1 correct
10(b)(iii)	9 [h] 24 or 23 to 24 [min]	**2**	**M1** for 930 ÷ (*their* 94 + 5) oe If 0 scored **SC1** for 9 h 53min to 9 h 54 min
11(a)(i)	Angle X is common oe $\angle XCB = \angle XAD$ (angles in same segment) oe	**2**	**B1** for each If 0 scored **SC1** for 2 pairs of angles without reasons
11(a)(ii)	$\frac{XA}{XC} = \frac{XD}{XB}$ oe	**1**	
11(b)	8	**2**	**M1** for $12 \times 7 = XA \times 6$ soi (implied by 14)
11(c)(i)	$\frac{49}{36}$ oe	**1**	
11(c)(ii)	$\frac{64}{25}$ oe	**1**	
12(a)	$-\frac{3}{4}$ or – 0.75	**1**	
12(b)	$\frac{4-x}{3}$ oe final answer	**2**	**M1** for $x = 4 – 3y$ or $y + 3x = 4$ or $y – 4 = –3x$ or $\frac{y}{3} = \frac{4}{3} – x$
12(c)	–17	**2**	**B1** for [f(3)] = 7 or **M1** for $4 – 3(2x + 1)$ soi

© UCLES 2018

Question	Answer	Marks	Partial Marks
12(d)	$9x - 8$ final answer	**2**	**M1** for $4 - 3(4 - 3x)$
12(e)	3	**2**	**M1** for $2^x - 1 = 7$ or $\log_2(x + 1)$ oe
12(f)	$\frac{5 - x}{(2x + 1)(4 - 3x)}$ oe final answer	**3**	**M1** for $4 - 3x + 2x + 1$ **M1** for common denominator $(2x + 1)(4 - 3x)$