Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/42**

Paper 4 (Extended) **May/June 2019**

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 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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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.

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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.

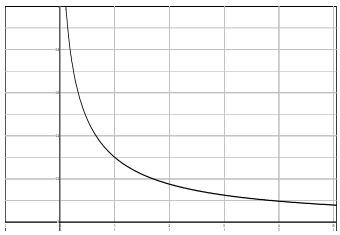
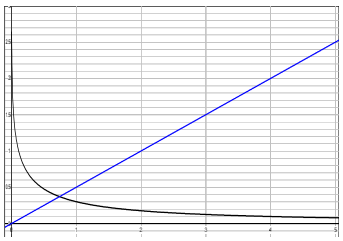
When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation '**dep**' is used to indicate that a particular M or B mark is dependent on an earlier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

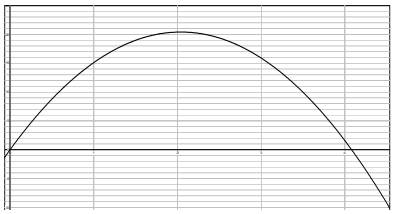
Question	Answer	Marks	Partial Marks
1(a)	$\frac{11}{11+14}\times 50$ or $\frac{11}{25}\times 50$ oe	**M1**	
1(b)	16 : 22 oe isw	**2**	**M1** for 22 – 6 and 50 –22 – 6 oe If 0 scored, **SC1** for 22 : 16 oe
1(c)	8.5[0]	**1**	
1(d)(i)	5.4[0]	**2**	**M1** for 0.9 × 6 oe
1(d)(ii)	4.1[0] nfww	**3**	**M2** for $\frac{3.69}{0.9}$ oe or **M1** for associating 3.69 with 90%

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Question	Answer	Marks	Partial Marks
2(a)	Correct sketch 	**2**	Must not cross axes **B1** for correct shape
2(b)	$y = 0$, $x = 0$	**2**	**B1** for each If 0 scored, **SC1** for answers x-axis and y-axis
2(c)	0.462 or 0.4624 to 0.4625	**1**	
2(d)	Correct sketch 	**1**	
2(e)	0.742 or 0.7415 to 0.7416	**1**	
2(f)	Region that is below $y = 0.5$ and above other two graphs.	**1**	
3(a)	0.3 0.8 0.05 and 0.95	**3**	**B1** **B1** **B1**
3(b)(i)	0.155 oe	**3**	**M2** for $0.7 \times 0.2 +$ *their* $0.3 \times$ *their* 0.05 or **M1** for 0.7×0.2 or *their* $0.3 \times$ *their* 0.05
3(b)(ii)	31	**1**	**FT** $200 \times$ *their* **(i)**
4(a)	12 cao final answer	**3**	**B2** for 11.98 to 12.02 or **M1** for $\pi \times 3^2 \times l + 2 \times \frac{2}{3} \times \pi \times 3^3 [=144\pi]$ oe
4(b)	3.53 or 3.528 to 3.529...	**2**	**M1** for $144\pi \times 7.8$ soi by figs 353 or 3528 to 3529

Question	Answer	Marks	Partial Marks
4(c)	2.95 or 2.96 or 2.950 to 2.963...	**3**	**M2** for $\frac{144\pi - 20\times 2.8^3}{144\pi}[\times 100]$ or $\frac{20\times 2.8^3}{144\pi}\times 100$ oe or **M1** for $144\pi - 20\times 2.8^3$ or $\frac{20\times 2.8^3}{144\pi}$ oe
4(d)	1.5 oe cao final answer	**3**	**B2** for 1.498 to 1.502 or **M2** for $3\times \sqrt[3]{\frac{18\pi}{144\pi}}$ oe or **M1** for $\sqrt[3]{\frac{18\pi}{144\pi}}$ or $\sqrt[3]{\frac{144\pi}{18\pi}}$ oe or better or for $\left(\frac{3}{x}\right)^3 = \frac{144\pi}{18\pi}$ oe
5(a)	224	**3**	**M2** for $200 + \frac{200\times 1.5\times 8}{100}$ oe or **M1** for $\frac{200\times 1.5\times 8}{100}$ oe implied by 24
5(b)	223.53	**3**	**M2** for $200\times\left(1+\frac{1.4}{100}\right)^8$ oe **M1** for $200\times\left(1+\frac{1.4}{100}\right)^k$ oe k integer > 1 If 0 scored, **SC1** for 23.5 or 23.52 to 23.53
5(c)	3 nfww cao	**2**	**M1** for trials with 1.5% **and** 1.4% beyond *their* 224 **and** *their* 223.53 respectively, implied by 11, or appropriate equation or graph sketch implied by 10.79..., 2.79...
6(a)	Correct reflection at (1, –1), (4, –1), (4, –3), (3, –3)	**1**	
6(b)	Correct translation at (5, –4), (2, –4), (2, –6), (3, –6)	**2**	**B1** for translation $\begin{pmatrix}6\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-3\end{pmatrix}$
6(c)	Rotation 90[°] clockwise oe (0, 1)	**3**	**B1** for each
6(d)	Correct stretch at (–1, –2), (–4, –2), (–4, –6), (–3, –6)	**2**	**B1** for stretch factor 2 displaced vertically

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Question	Answer	Marks	Partial Marks
7(a)	15.1	**1**	
7(b)(i)	Correct sketch 	**2**	Must pass through origin and cross x-axis reasonably close to $x = 4$, not 4.5. **B1** for correct shape
7(b)(ii)	[h =] 20.4 or 20.40 to 20.41 [t =] 2.04 or 2.040 to 2.041	**2**	**B1** for each or both correct reversed answers
7(b)(iii)	4.08 or 4.081 to 4.082	**1**	
7(b)(iv)	1.4[0] or 1.401 to 1.403	**3**	**B1** for 2.74 or 2.741 to 2.742 **B1** for 1.34 or 1.339 to 1.340
8(a)	$7n$ oe	**1**	
8(b)	$13 - 3n$ oe	**2**	**B1** for $k - 3n$ or $13 - kn$ oe
8(c)	2^{n+2} oe	**2**	**B1** for [$c\times$] 2^{n+k} where c is a power of 2 and k is any integer (including 0) seen
8(d)	$n^2 + n$ oe	**2**	**B1** for quadratic expression or for second differences = 2 seen
9(a)	$50 < t \leqslant 55$	**1**	Allow e.g. 50 to 55
9(b)	50	**2**	**M1** for at least three of 30, 45, 52.5, 65 soi
9(c)	Correct histogram	**4**	**B1** for each correct column height. **B1** for all widths correct If 0 scored, **SC1** for 7, 24, 1.5 seen
9(d)(i)	$\frac{30}{240}$ oe	**1**	
9(d)(ii)	$\frac{22350}{57360}$ oe	**2**	**M1** for $\frac{150}{240}\times\frac{149}{239}$
9(d)(iii)	40 ... 50	**2**	**M1** for $\frac{k}{240}\times\frac{k-1}{239}$ attempted

Question	Answer	Marks	Partial Marks
10(a)	$3p + r = 67$ oe $2p + 3r = 96$ oe	**B2**	**B1** for each Accept words in equations, using + and =.
	correctly eliminating one variable	**M1**	
	[pencil =] 15	**B1**	
	[ruler =] 22	**B1**	If M0 scored in addition to B0 (for answers) scored then award **SC1** for answers satisfying one of *their* two original equations in 2 variables
10(b)(i)	$\frac{1}{2}(x+1)x = \left(\frac{5x}{4}+3\right)(x-4)$ oe	**M2**	**M1** for $\frac{1}{2}(x+1)x$ or $\left(\frac{5x}{4}+3\right)(x-4)$
	$\frac{5x^2}{4} - 5x + 3x - 12$ oe	**B1**	i.e. correct expansion for rectangle
	$3x^2 - 10x - 48 = 0$ reached with no errors or omissions including at least one line of working	**A1**	Dependent on B1
10(b)(ii)	$(3x + 8)(x - 6)$	**2**	**B1** for $3x(x-6) + 8(x-6)$ or $x(3x+8) - 6(3x+8)$ or $(3x + a)(x + b)$ with $ab = -48$ or $a + 3b = -10$
10(b)(iii)	21	**2**	**FT** $\frac{1}{2} \times (their\ \text{positive}\ x) \times (their\ \text{positive}\ x+1)$ if $x > 4$ **M1** $\frac{1}{2}$ × (*their* positive x) × (*their* positive x + 1) if $x > 4$
11(a)	118 or 117.7 to 117.8	**3**	**M2** for $\frac{102}{\cos 30}$ oe or **M1** for $\frac{102}{DC} = \cos 30$ oe or $102 = DC \times \cos 30$ oe
11(b)	106 or 106.2...	**3**	**M1** for $110^2 + 102^2 - 2 \times 110 \times 102 \times \cos 60$ **A1** for 11 284
11(c)	7860 or 7858 to 7870	**3**	**M1** for $0.5 \times 102 \times$ *their DC* $\times \sin 30$ oe (3000 or 3010 or 3001 to 3009) **M1** for $0.5 \times 102 \times 110 \times \sin 60$ oe (4860 or 4858...)

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Question	Answer	Marks	Partial Marks
11(d)	236 or 236.2 to 236.4...	**4**	**B2** for 56.3 or 56.4 or 56.25 to 56.44... or **M2** for $\frac{102\sin 60}{their\ AB}$ oe or **M1** for $\frac{\sin 60}{their AB} = \frac{\sin BAD}{102}$ oe **and M1** for 180 + *their* angle *BAD* oe
12(a)	10	**1**	
12(b)	9.5 oe	**2**	**M1** for $10 - \frac{1}{x}$ soi e.g. $10 - \frac{1}{2}$
12(c)	$x^2 - 20x + 101$	**3**	**M1** for $(10 - x)^2 + 1$ **B1** for $100 - 10x - 10x + x^2$ oe
12(d)	f(x) and h(x)	**2**	**B1** for each
12(e)	$\frac{10 - 2x}{x(10 - x)}$ oe	**3**	**M1** for common denominator $x(10 - x)$ oe **B1** for $(10 - x) - x$ oe seen
12(f)(i)	5	**1**	
12(f)(ii)	$3\sqrt{3}$ oe or $3^{\frac{3}{2}}$ or 5.2[0] or 5.196...	**1**	
12(f)(iii)	3^x	**2**	**M1** for $x = \log_3 y$ or $x = 3^y$

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