Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education (9–1)

MATHEMATICS **0626/02**

Paper 2 **October/November 2017**

MARK SCHEME

Maximum Mark: 60

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.

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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.

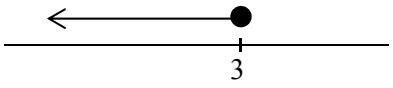
B Mark for a correct result or statement independent of Method marks.

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

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Question	Answer	Marks	Partial Marks
1	141 or 141.3 to 141.4	**2**	**M1** for $\pi \times 3^2 \times 5$ soi
2(a)	$x \leqslant 3$ final answer	**2**	**M1** for $7x \leqslant 9 + 2$ **M1** for $x \leqslant \frac{b}{a}$ after $ax \leqslant b$ seen **max 1 mark if answer incorrect** If 0 scored, **SC1** for answer 3 or x 3 with any incorrect equality or inequality symbol or answer $7 \times 3 - 2 \leqslant 19$
2(b)		**1**	**FT** *their* inequality in (a)
3	1.5 oe	**3**	**M1** for $8 - 2x = 5$ or $56 - 14x = 35$ **M1** for collecting *their* like terms **M1** for $x = \frac{b}{a}$ after $ax = b$ seen **max 2 marks if answer incorrect**
4	Number (order) each student from 1 to 360 Choose every 18th student	**2**	**B1** for incomplete explanation or 18 seen If 0 scored, **SC1** for details of how to select a random sample
5	58.4 to 58.5	**4**	**M1** for $\pi \times 4.9^2$ [÷ 2] **M1** for $2 \times 10.1 \times 15.2$ or $3 \times 10.1 \times 15.2$ **M1** for *their* shaded area ÷ *their* total area
6	$14x^7y^4$ final answer	**2**	**B1** for x^7 or y^4 seen in answer
7	$c = \frac{S - 3dh}{d}$ final answer or $c = \frac{S}{d} - 3h$ final answer	**2**	**M1** for $S - 3dh = cd$ or $\frac{S}{d} = c + 3h$ or for $\frac{S - 3dh}{d}$ or $\frac{S}{d} - 3h$
8	Correct comparison of the correct values with 3.14159[…] $\frac{22}{7} - \pi = 0.00126[...]$ or 0.00127 and $\frac{7}{3}\left(1 + \frac{\sqrt{3}}{5}\right) - \pi = 0.00003[\ldots]$	**3**	**B2** for 0.00003[…] and 0.00126[…] oe seen or **B1** for one of the values 0.00003[…] or 0.00126[…] oe or for $\frac{22}{7}$ = 3.14285[…] or 3.14286 and $\frac{7}{3}\left(1 + \frac{\sqrt{3}}{5}\right)$ = 3.14162[…] seen
9	$x = 13$ $y = 7$ $z = 5$	**3**	**B2** for correct figures in wrong order or two correct answers or $5 \times 7 \times 13$ seen or **B1** for 5, 7 or 13 seen on answer line or xyz [= 455] seen or **M1** for attempt to divide 455 by an integer $n > 2$

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Question	Answer	Marks	Partial Marks
10	16500	**3**	**M2** for 14520 ÷ (1 – 0.12) or 165 (is 1%) oe seen or **B1** for 88[%] oe seen
11	15.7 or 15.66 to 15.67	**3**	**M2** for $\pi \times 12 \times \frac{35}{360} + 6 + 6$ oe or **M1** for $\pi \times 12 \times \frac{35}{360}$ oe
12(a)	Correct Box Plot	**2**	**M1** for median and quartiles plotted correctly with an appropriate vertical line or box with 2 values correct
12(b)(i)	22000	**1**	
12(b)(ii)	24000	**1**	
13(a)	$\frac{x+3}{4}$ final answer oe	**2**	**M1** for $y + 3 = 4x$ or $\frac{y}{4} = x - \frac{3}{4}$ or $x = 4y - 3$ If 0 scored, **SC1** for $\frac{y+3}{4}$
13(b)(i)	Valid explanation	**1**	e.g. He has found gf(x)
13(b)(ii)	$4x^2 - 3$	**1**	
14	$y = -\frac{1}{2}x + 7$ oe	**3**	**B1** for gradient = $-\frac{1}{2}$ oe **M1** for substituting $x = 4$ and $y = 5$ in *their* linear equation oe
15(a)	8.66 or 8.660[…]	**4**	**M3** for $\sqrt{5^2 + 5^2 - 2 \times 5 \times 5 \times \cos 120}$ or $\frac{5 \times \sin 120}{\sin 30}$ or **M2** for $5^2 + 5^2 - 2 \times 5 \times 5 \times \cos 120$ or $\frac{BC}{\sin 120} = \frac{5}{\sin 30}$ oe or **M1** for identifying angle $OBC = 30$ or angle $BOC = 120$ oe Alternative Method If X is such that OX is perpendicular to BC **M3** for $2 \times 5\cos 30$ or $2 \times 5\sin 60$ or **M2** for $[BX] = 5\cos 30$ or $5\sin 60$ or **M1** for identifying angle $OBC = 30$ or angle $BOX = 60$ oe
15(b)	32.5 or 32.47 to 32.48	**2**	**M1** for $0.5 \times \textit{theirBC} \times \textit{theirBC} \times \sin 60$ or $0.5 \times 5 \times 5 \times \sin 120 \times 3$ or $0.5 \times \textit{theirBC} \times (5 + 5\sin 30)$ or $0.5 \times \textit{theirBC} \times 2.5 \times 3$

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Question	Answer	Marks	Partial Marks
16(a)	Correct completion to $x = 5 - \frac{x}{3}$ (Answer Given)	**2**	**M1** for correct first step $x^2 = 5x - 3$ or $\frac{x^2 - 5x + 3}{x} = 0$ oe
16(b)	Iteration leading to 4.30	**3**	**B1** for $x_2 = 4.25$ **M1** for $x_3 = 4.294[\ldots]$ **and** $x_4 = 4.301[...]$ using *their* x_2 and x_3
17(a)	$x^2 - 4x + 4 + 3$ or $(x - 2)^2 - 4 + 7$	**1**	Answer Given
17(b)	Valid Explanation	**1**	e.g. As $(x - 2)^2 \geqslant 0$, $(x - 2)^2 + 3 > 0$ so $(x - 2)^2 + 3$ cannot equal 0. oe e.g. $b^2 - 4ac = 16 - 28 = -12 < 0$
17(c)	(2, 3)	**1**	
17(d)	Correct sketch of quadratic with minimum at (2, 3) indicated	**2**	**FT** from *their* (c), if y co-ordinate > 0 **B1** for any symmetrical U-shaped quadratic
18	$\frac{2}{7}$	**3**	**M1** for $(1 - p)^3 = \frac{125}{343}$ soi **M1** for $\left(\frac{125}{343}\right)^{\frac{1}{3}}$ soi

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