

### MATHEMATICS

0626/02 October/November 2017

Paper 2 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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International Education

# 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

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

## Cambridge IGCSE (9–1) – Mark Scheme **PUBLISHED**

Question	Answer	Marks	Partial Marks
1	141 or 141.3 to 141.4	2	<b>M1</b> for $\pi \times 3^2 \times 5$ soi
2(a)	$x \leq 3$ final answer	2	M1 for $7x \le 9+2$ M1 for $x \le \frac{b}{a}$ after $ax \le b$ 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 $7 \times 3 - 2 \le 19$
2(b)	3	1	<b>FT</b> <i>their</i> inequality in (a)
3	1.5 oe	3	M1 for $8 - 2x = 5$ or $56 - 14x = 35$ M1 for collecting <i>their</i> 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	<b>B1</b> for incomplete explanation or 18 seen If 0 scored, <b>SC1</b> for details of how to select a random sample
5	58.4 to 58.5	4	<b>M1</b> for $\pi \times 4.9^2$ [÷ 2] <b>M1</b> for 2 × 10.1 × 15.2 or 3 × 10.1 × 15.2 <b>M1</b> for <i>their</i> shaded area ÷ <i>their</i> total area
6	$14x^7y^4$ final answer	2	<b>B1</b> 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[] $\frac{22}{7} - \pi = 0.00126[] \text{ or } 0.00127$ and $\frac{7}{3} \left(1 + \frac{\sqrt{3}}{5}\right) - \pi = 0.00003[]$	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 $\frac{7}{3}(1+\frac{\sqrt{3}}{5}) = 3.14162[]$ seen
9	x = 13 y = 7 z = 5	3	<b>B2</b> for correct figures in wrong order or two correct answers or $5 \times 7 \times 13$ seen or <b>B1</b> for 5, 7 or 13 seen on answer line or <i>xyz</i> [= 455] seen or <b>M1</b> for attempt to divide 455 by an integer $n > 2$

## Cambridge IGCSE (9–1) – Mark Scheme **PUBLISHED**

Question	Answer	Marks	Partial Marks
10	16500	3	M2 for $14520 \div (1 - 0.12)$ or $165$ (is 1%) oe seen or B1 for $88[\%]$ oe seen
11	15.7 or 15.66 to 15.67	3	<b>M2</b> for $\pi \times 12 \times \frac{35}{360} + 6 + 6$ oe or <b>M1</b> 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( <i>x</i> )
13(b)(ii)	$4x^2 - 3$	1	
14	$y = -\frac{1}{2}x + 7$ oe	3	<b>B1</b> for gradient = $-\frac{1}{2}$ oe <b>M1</b> for substituting $x = 4$ and $y = 5$ in <i>their</i> 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 <u>Alternative Method</u> If X is such that OX is perpendicular to BC M3 for 2 × 5cos30 or 2 × 5sin60 or M2 for $[BX] = 5\cos 30$ or 5sin60 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 $0.5 \times theirBC \times theirBC \times sin60$ or $0.5 \times 5 \times 5 \times sin120 \times 3$ or $0.5 \times theirBC \times (5 + 5sin30)$ or $0.5 \times theirBC \times 2.5 \times 3$

# Cambridge IGCSE (9–1) – Mark Scheme **PUBLISHED**

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	<b>B1</b> for $x_2 = 4.25$ <b>M1</b> for $x_3 = 4.294[]$ and $x_4 = 4.301[]$ using <i>their</i> $x_2$ 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 $(x-2)^2 \ge 0$ , $(x-2)^2 + 3 > 0$ 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	<b>FT</b> from <i>their</i> (c), if <i>y</i> co-ordinate > 0 <b>B1</b> for any symmetrical U-shaped quadratic
18	$\frac{2}{7}$	3	M1 for $(1-p)^3 = \frac{125}{343}$ soi M1 for $(\frac{125}{343})^{\frac{1}{3}}$ soi