Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/22**

Paper 2 (Extended) **October/November 2018**

MARK SCHEME

Maximum Mark: 70

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 October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level 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.

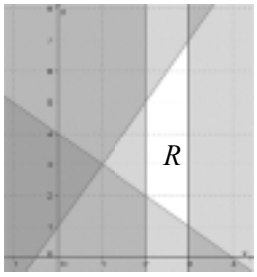
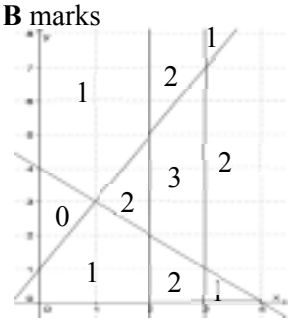
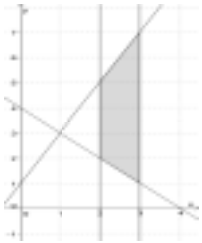
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Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Marks	Partial Marks
1	2.3×10^4	**1**	
2	5	**1**	
3	4	**1**	
4	$6x - 2x^3$ final answer	**2**	**B1** for $6x$ or $-2x^3$
5	$\left[\frac{1}{15}+\right]\frac{2\times3}{5\times3}$	**M1**	or better e.g. $\left[\frac{1}{15}+\right]\frac{6}{15}$ Allow any correct common denominator $15k$
	$\frac{7}{15}$ cao	**A1**	
6	$m \geqslant 3$ final answer	**2**	**M1** for correct first step e.g. $7m \geqslant 19 + 2$
7(a)	$C \cap D = \{10\}$	**1**	
7(b)	7	**1**	
8	$(x + 5)(y + 2)$ final answer	**2**	**B1** for $y(x + 5) + 2(x + 5)$ or $x(y + 2) + 5(y + 2)$
9	26 600 cao	**2**	**M1** for $30000 \times \left(1 - \frac{2}{100}\right)^6$ oe
10	$\left(2w, \frac{r+t}{2}\right)$ final answer	**2**	**B1** for $2w$ oe nfww or $\frac{r+t}{2}$ oe
11	34.5 and 37.5 final answers	**2**	**B1** for 11.5 or 12.5 seen or **M1** for $(12 - 0.5) \times 3$ or $(12 + 0.5) \times 3$
12	154.5 or 154.5…	**2**	**B1** for 25.5 or 25.46 to 25.47 or **M1** for $180 - \sin^{-1}(0.43)$ oe
13	$6n - 10$ oe	**2**	**B1** for $6n + c$ or $kn - 10$ $(k \neq 0)$

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Question	Answer	Marks	Partial Marks
14	Correct region identified 	**3**	**B** marks  or **SC1** for 
15(a)	$\begin{pmatrix} 15 & -9 \\ -3 & 6 \end{pmatrix}$	**1**	
15(b)	$\frac{1}{7}\begin{pmatrix} 2 & 3 \\ 1 & 5 \end{pmatrix}$ oe isw	**2**	**B1** for $k\begin{pmatrix} 2 & 3 \\ 1 & 5 \end{pmatrix}$ soi or det = 7 soi
16	(a =) 36 (b =) –6	**3**	**B2** for $a = 36$ or **M1** for $b = -6$ or $x^2 + bx + bx + b^2$ or better or $b^2 = a$
17	$-2x + 5$	**4**	**M1** for $\frac{7-2}{9--1}$ oe **M1** for gradient of perpendicular = $\frac{-1}{their\ 0.5}$ **M1** for (1, 3) correctly substituted into *their* $y = -2x + c$
18	Correct pie chart e.g. 	**4**	**B3** for correct chart no labels or for 2 correct sectors with or without labels or **B2** for 3 correct angles seen (171°, 135° and 54°) or 3 correct percentages **(**47.5%, 37.5% and 15%) or **M1** for method e.g. $\frac{57}{120} \times 360$, 57×3 or $\frac{57}{120} \times 100$ oe or one correct sector on the pie chart
19(a)	Correct ruled bisector with two pairs of arcs	**2**	**B1** for correct ruled bisector with no/wrong arcs
19(b)	Correct arc centre E radius 3 cm inside pentagon	**1**	
19(c)	Correct region shaded	**1**	Dependent on at least **B1** in part **(a)** and 1 mark in part **(b)** and a closed region

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Question	Answer	Marks	Partial Marks
20	$\frac{2x}{3+x}$ oe final answer	**4**	**M1** for correctly clearing the denominator and expanding bracket **M1** for correctly collecting terms in *m* on one side and terms not in *m* on the other **M1** for correct factorising **M1** for correct division dependent on *m* appearing only once in a factorised expression
21	30.2 or 30.20 to 30.21…	**4**	**M3** for $\frac{1}{2}\times 10\times 10\times \sin 60 - \frac{60}{360}\times \pi \times \left(\frac{10}{2}\right)^2$ or **M1** for $\frac{k}{360}\times \pi \times \left(\frac{10}{2}\right)^2$ oe and **M1** for $\frac{1}{2}\times 10\times 10\times \sin c$ oe
22	25.1 or 25.06…	**4**	**M3** for tan = $\frac{8}{\sqrt{16.2^2+5.5^2}}$ oe or **M2** for $\sqrt{16.2^2+5.5^2}$ or **M1** for $16.2^2+5.5^2$ or **B1** for identifying correct angle
23(a)	$2^3 \times 7$ or $2 \times 2 \times 2 \times 7$	**2**	**B1** for identifying 2 and 7 as the only prime factors
23(b)	168	**2**	**B1** for 168*k* or $2 \times 2 \times 2 \times 3 \times 7$ oe or for listing multiples of each up to 168
24(a)	25	**1**	
24(b)	12	**2**	**B1** for 16 or 28
24(c)	5	**2**	**B1** for 75
25(a)(i)	$5x^3 + 2$ final answer	**1**	
25(a)(ii)	$\frac{x-2}{5}$ final answer	**2**	**M1** for correct first step e.g. $y - 2 = 5x$, $x = 5y + 2$, $\frac{y}{5} = x + \frac{2}{5}$
25(b)	5	**2**	**M1** for $a \times (-2)^2 + 1 = 21$

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