Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/23**

Paper 2 (Extended) **October/November 2019**

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 2019 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.

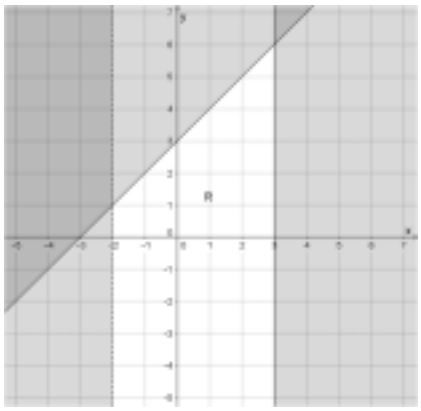
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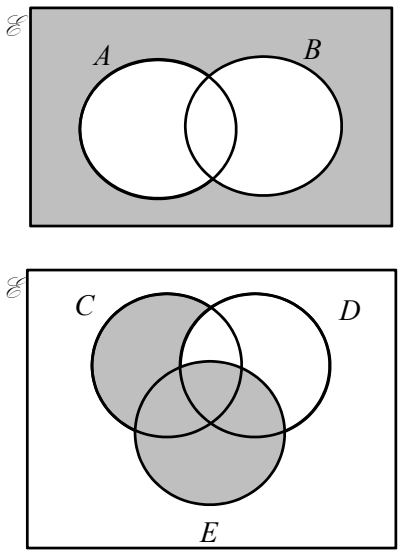
Abbreviations

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

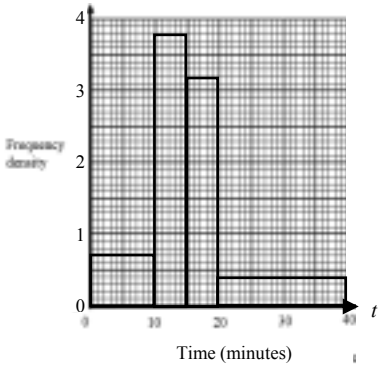
Question	Answer	Marks	Partial Marks
1	–10	**1**	
2	6	**1**	
3(a)	27	**1**	
3(b)	47	**1**	
4	21	**2**	**M1** for [84 =] 2 × 2 × 3 × 7 or [105 =] 3 × 5 × 7 or 3 × 7 as final answer or **B1** for 3 or 7 as final answer
5(a)	7.2×10^4	**1**	
5(b)	1.8×10^{-3}	**1**	
6	$x^2 + 8x + 15$ final answer	**2**	**M1** for three terms correct from $x^2 + 3x + 5x + 15$
7	$-\frac{2}{5}$ or – 0.4	**2**	**M1** for gradient = $\frac{5}{2}$ oe soi
8(a)	21.1 or 21.10…	**1**	
8(b)	158.9 or 158.8 to 158.9	**1**	**FT** 180 – *their* **(a)** providing answer is an obtuse angle
9	298	**3**	**M2** for [2 ×] (5 × 7 + 5 × 9.5 + 7 × 9.5) oe or **M1** for one correct area, 5 × 7 or 5 × 9.5 or 7 × 9.5
10	30	**3**	**M1** for $\frac{391+n+n-1}{3} = 5n$ oe **M1** for correct first step for solving *their* equation e.g. $391+n+n-1 = 3\times 5n$, $\frac{390+2n}{3} = 5n$
11(a)	$3(4x + 5)$ final answer	**1**	
11(b)	$(x + 3)(y – 2)$ final answer	**2**	**B1** for $y(x + 3) – 2(x + 3)$ or $x(y – 2) + 3(y – 2)$ or correct answer seen then spoilt

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Question	Answer	Marks	Partial Marks
12	7.62 or 7.615 to 7.616	**3**	**M2** for $\sqrt{(9-2)^2+(4-1)^2}$ oe or **M1** for $(9-2)^2+(4-1)^2$ oe or 58
13	2.75 oe	**3**	**M2** for $6--5=2(3k-k)$ oe or better or **M1** for $\frac{6--5}{3k-k}$ oe If 0 scored, **SC1** for -2.75 oe as answer
14(a)	$\frac{1}{2n}$ oe final answer	**1**	
14(b)	5^{n-1} oe final answer	**2**	**M1** for recognition of terms being powers of 5
15	$\frac{2}{12}$ oe or $\frac{1}{2}\times\frac{1}{3}$ $\quad$ $\frac{2}{3}\left(1+\frac{1}{4}\right)$	**M1**	**M1** for correct first step to deal with multiplication
	$\frac{8}{12}[+]\frac{2}{12}$ oe $\quad$ $\frac{2}{3}\times\frac{5}{4}$	**M1**	**M1** for correct working for common denominator with *their* $\frac{2}{12}$ oe or correct evaluation of bracket
	$\frac{5}{6}$ cao	**A2**	**A1** for $\frac{10}{12}$ oe
16(a)	12.88	**1**	
16(b)	two correct points plotted	**1**	
16(c)	ruled line of best fit	**1**	
16(d)	negative	**1**	
17		**4**	**B1** for $x = -2$ dashed ruled line and $x = 3$ solid ruled line **B1** for $y = x + 3$ solid ruled line **B2** for indication of correct region or **B1** for shading that satisfies two of the inequalities, e.g. two of $x > -2$, $x \leqslant 3$ and $y \leqslant x + 3$

Question	Answer	Marks	Partial Marks
18(a)(i)	4	**1**	
18(a)(ii)	At least one and fewer than four numbers from {2, 3, 4, 5}	**1**	
18(b)		**2**	**B1** for each
19(a)	0.3 or $\frac{3}{10}$	**1**	
19(b)	760	**3**	**M2** for correct complete area statement e.g. $70 \times 10 + \frac{1}{2} \times 20 \times 6$ oe or **M1** for one of these area calculations 70×10, $\frac{1}{2} \times 20 \times 6$, 50×10 or $\frac{1}{2} \times (16 + 10) \times 20$
20(a)	$\frac{45}{(x+1)^2}$ final answer	**2**	**M1** for $t = \frac{k}{(x+1)^2}$
20(b)	4	**2**	**M1** for $1.8 \times (x + 1)^2 =$ *their* 45 or better
21(a)	$\frac{1}{5}\begin{pmatrix} -5 & -10 \\ -1 & -3 \end{pmatrix}$ oe isw	**2**	**M1** for $k\begin{pmatrix} -5 & -10 \\ -1 & -3 \end{pmatrix}$ or det = 5 soi
21(b)	[x =] 6 [y =] 7	**3**	**B1** for $x = 6$ **B2** for $y = 7$ or **M1** for $2 \times 1 + 9y = 65$ or $2 \times -4 + 2y = 6$

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Question	Answer	Marks	Partial Marks
22	15.2	**5**	**M4** for $\left(\pi\times5^2\times12-\frac{1}{3}\times\pi\times5^2\times4.8\right)\div\left(\pi\times5^2\right)$ or **M3** for $\pi\times5^2\times12-\frac{1}{3}\times\pi\times5^2\times4.8$ or **M1** for $\pi\times5^2\times12$ **M1** for $\frac{1}{3}\times\pi\times5^2\times4.8$
23(a)	10 [< $t \leqslant$] 15	**1**	
23(b)	Correct histogram  	**3**	**B1** for each correct block If 0 scored, **SC1** for correct frequency densities 3.8, 3.2, 0.4 soi by correct heights

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