Cambridge Assessment International Education

Cambridge IGCSE™

MATHEMATICS **0580/22**

Paper 2 Extended **October/November 2022**

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 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

© UCLES 2022

[Turn over

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.

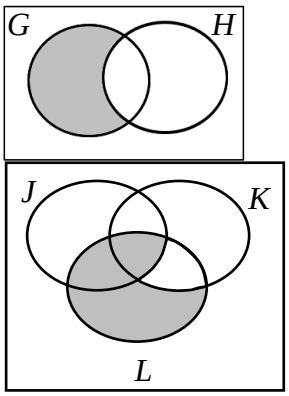
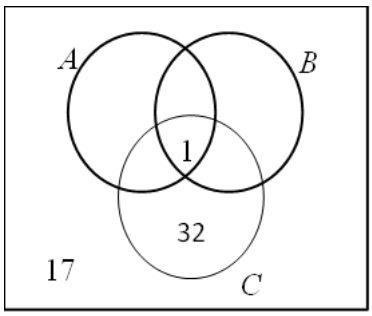
© UCLES 2022

Maths-Specific Marking Principles	
1	Unless a particular method has been specified in the question, full marks may be awarded for any correct method. However, if a calculation is required then no marks will be awarded for a scale drawing.
2	Unless specified in the question, answers may be given as fractions, decimals or in standard form. Ignore superfluous zeros, provided that the degree of accuracy is not affected.
3	Allow alternative conventions for notation if used consistently throughout the paper, e.g. commas being used as decimal points.
4	Unless otherwise indicated, marks once gained cannot subsequently be lost, e.g. wrong working following a correct form of answer is ignored (isw).
5	Where a candidate has misread a number in the question and used that value consistently throughout, provided that number does not alter the difficulty or the method required, award all marks earned and deduct just 1 mark for the misread.
6	Recovery within working is allowed, e.g. a notation error in the working where the following line of working makes the candidate's intent clear.

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

© UCLES 2022

Question	Answer	Marks	Partial Marks
1	112	**2**	**M1** for $180 - 34 \times 2$ oe
2	$-50y$	**1**	
3	0	**1**	
4	$3x + x^3$ final answer	**2**	**B1** for one correct term from two in final answer or for correct answer then spoilt
5	6.55	**3**	**M2** for $(33.48 - 2.4 \times 0.85)$ oe or **M1** for 2.4×0.85
6(a)	2 –9	**2**	**B1** for one correct
6(b)	Sequence A $7n - 4$ oe final answer	**2**	**B1** for $7n + c$ or $kn - 4$ $k \neq 0$ or for correct answer seen then spoilt
	Sequence B $3n^2 - 1$ oe final answer	**2**	**M1** for finding second differences of 6 or has an answer that is a quadratic sequence or for correct answer seen then spoilt
7	$\frac{10}{18}$ and $\frac{3}{18}$	**M1**	Allow any correct common denominator $18k$
	$\frac{7}{18}$ cao	**A1**	
8(a)	3.5	**2**	**M1** for values in correct order 1.5 2 2 3 4 4.5 5 18 or 3 and 4 identified as middle numbers
8(b)	One extreme value oe	**1**	
9(a)	A and C	**1**	
9(b)	ASA	**1**	
10(a)	3456	**1**	
10(b)	0.75 or $\frac{3}{4}$ oe	**1**	
10(c)	0.25 or $\frac{1}{4}$	**1**	
11(a)	5	**2**	**M1** for $(0 - 3)(0 + b)(0 + 2) = -30$ oe or better

Question	Answer	Marks	Partial Marks
11(b)	(3, 0)	**1**	
12	5×199^{57}	**2**	**M1** for [315 =] $3^2 \times 5 \times 7$ oe or $3^2 \times 5^2 \times 7 \div 315 = 5$
13(a)	A correct cumulative frequency diagram	**3**	**B1** for correct horizontal placement for 7 plots **B1** for correct vertical placement for 7 plots **B1FT dep** on at least B1 for reasonable increasing curve or polygon through *their* 7 points If 0 scored **SC1 FT** for 6 out of 7 points correctly plotted
13(b)	33 to 34.5	**1**	**FT** *their* increasing cumulative frequency graph
14	104	**2**	**M1** for 0.5×136 oe or 0.25×144 oe
15	Opposite angles add up to 180 oe	**1**	
16(a)		**2**	**B1** for each
16(b)		**2**	**B1** for 2 correct
17(a)	9	**1**	
17(b)	$2x - 5$ final answer	**2**	**M1** for correct first step e.g. $x = \frac{y+5}{2}$ or $2y = x + 5$ or $y - \frac{5}{2} = \frac{x}{2}$ or better

Question	Answer	Marks	Partial Marks
17(c)	11	**3**	**M1** for $\frac{x^2+5}{2}$ **M1** for $hh^{-1}(63) = 63$ soi
18	$419.\dot{1}\dot{9} - 4.\dot{1}\dot{9}$ oe	**M1**	
	$\frac{83}{198}$ cao	**A2**	**Al** for $\frac{415}{990}$ oe If M0 scored **SC1** for $\frac{k}{990}$ or correct answer with insufficient working
19	$\frac{3}{7}$ oe	**3**	**M1** for clearly identifying the 7 even outcomes 2 6, 3 5, 3 7, 3 9, 5 5, 5 7, 5 9 **M1** for clearly identifying the 3 even outcomes with just one five 3 5, 5 7 and 5 9 If 0 scored **SC1** for answer $\frac{1}{4}$ oe
20(a)	$27x^{12}$ final answer	**2**	**B1** for kx^{12} or $27x^c$ final answer or for $27x^{12}$ then spoilt
20(b)	[±] y	**1**	
21	228 or 228.3 to 228.4	**4**	**M1** for $\frac{1}{3}\times\pi\times\left(\frac{9.2}{2}\right)^2\times 12.5$ oe **M1** for $\frac{9.2}{12.5} = \frac{diameter}{12.5-5.5}$ oe or better **M1** for $\frac{1}{3}\times\pi\times\left(\frac{their 5.152}{2}\right)^2\times(12.5-5.5)$ oe OR **M2** for $\frac{\pi}{3}\times\left(\frac{9.2}{2}\right)^2\times 12.5 - \frac{\pi}{3}\times r^2\times(12.5-5.5)$ oe for any $r < 4.6$ If 0 scored **SC1** for 913 or 913.3 to 913.5

Question	Answer	Marks	Partial Marks
22	45	**3**	**M2** for $\sqrt[3]{\frac{875}{56}} \times 18$ oe or **M1** for $\sqrt[3]{\frac{875}{56}}$ or $\sqrt[3]{\frac{56}{875}}$ oe or $\frac{18^3}{h^3} = \frac{56}{875}$ oe
23	$[0 =] 6x^2 - 19x + 3$	**B5**	**B4** for $8x - 20 + 2x + 2 = 6x^2 + 6x - 15x - 15$ or better OR **M2** for $4(2x - 5) + 2(x + 1) = 3(x + 1)(2x - 5)$ oe or **M1** for $4(2x - 5) + 2(x + 1)$ or better or common denominator $(x + 1)(2x - 5)$ or better **B1** for $2x^2 + 2x - 5x - 5$ or better seen **M1** for correctly simplifying *their* quadratic to the form $[0 =] ax^2 + bx + c$
	Correct method to solve *their* three term quadratic	**M1**	e.g. $(6x - 1)(x - 3)$ $\frac{-(-19) \pm \sqrt{(-19)^2 - 4 \times 6 \times 3}}{2 \times 6}$
	$x = 3$, $x = \frac{1}{6}$ oe	**B1**	