Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/21**

Paper 2 (Extended) **October/November 2017**

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 2017 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is a registered trademark.

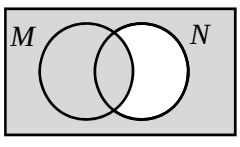
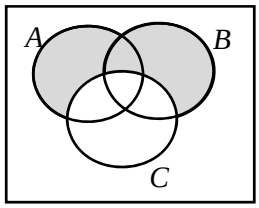
© UCLES 2017

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	Mark	Partial marks
1	101	**1**	
2	2	**1**	
3(a)	1.49220….	**1**	
3(b)	1.5	**1FT**	**FT** *their* answer to **(a)** rounded correctly to 2 significant figures
4	88	**2**	**M1** for $\frac{68+81+74+89+x}{5} = 80$ oe or **B1** for 400
5	$3x(4x + 5y - 3)$ final answer	**2**	**B1** for $3(4x^2 + 5xy - 3x)$ or $x(12x + 15y - 9)$ allow in working or correct answer spoiled If zero scored, **SC1** for $3x(4x + 5y - 3)$ with only 2 correct elements in the brackets, allow in working
6(a)	$(-2, 3)$	**1**	
6(b)	Correct rhombus with 4th point at (2,2)	**1**	
7	Diagonal line from (0, 0) to (30, 12)	**1**	
	and Horizontal line from (30, 12) to (70, 12)	**1FT**	**FT** for horizontal line from (30, *k*) to (70, *k*) where *k* is *their* 12
8	19.65 cao	**2**	**B1** for 6.55 seen (must be evaluated, not 6.5 + 0.05) or **M1** for 3 × (6.5 + 0.05)
9	7615.15	**2**	**M1** for $12\,400 \times \left(1-\frac{15}{100}\right)^3$ oe

© UCLES 2017

Question	Answer		Mark	Partial marks
10	$\frac{5}{3}$	$\frac{2}{3}+\frac{4}{15}$	**B1**	Allow $\frac{5k}{3k}$
	$\frac{25}{15}$ [and $\frac{11}{15}$]	$\frac{10}{15}$ [and $\frac{4}{15}$]	**M1**	Correct method to find common denominator e.g. $\frac{75}{45}$ and $\frac{33}{45}$ Follow through *their* $\frac{5}{3}$ for the **M1** mark
	$\frac{14}{15}$ cao	$\frac{14}{15}$ cao	**A1**	
11	54		**3**	**M2** for $\frac{180\times(5-2)}{5}$ or $180-\frac{360}{5}$ or **M1** for $180\times(5-2)$ or $\frac{360}{5}$
12(a)	343		**1**	
12(b)	−11		**1**	
12(c)	343		**1**	
13(a)	m^{10} final answer		**1**	
13(b)	$20x^5y^2$ final answer		**2**	**B1** for 2 out of 3 elements correct in final answer or correct answer spoiled
14(a)	(9, −4)		**1**	
14(b)	−5		**2**	**M1** for $t^2 + 12^2 = 13^2$ oe or **SC1** for answer 5 or ± 5
15(a)	Fewer than 6 elements from {1, 2, 3, 4, 5, 6} or ∅		**1**	
15(b)			**1**	
			**1**	

Question	Answer	Mark	Partial marks
16	Enlargement	**1**	
	$\frac{1}{3}$	**1**	
	(2, 1)	**1**	
17(a)	$(y =) \frac{72}{(x+1)^2}$ oe	**2**	**M1** for $y = \frac{k}{(x+1)^2}$
17(b)	32	**1FT**	**FT** correct evaluation from *their* equation in **(a)** using 0.5
18	Correct position of *S* with 2 pairs of correct construction arcs for line	**4**	**B3** for correct position of *S* with missing/incorrect construction arcs but correct line or **B2** for correct ruled line equidistant from the two trees with correct arcs or **B1** for correct line with no/wrong arcs or correct arcs with no line and **B1** for arc centre bird bath, radius 5 cm or *S* in correct position with no/incorrect working
19	$\frac{x^2 + 20x + 31}{2(x-3)(x+7)}$ final answer	**4**	**B1** for a common denominator of [2]$(x – 3)(x + 7)$ seen isw **M1** for $2\times5\times(x + 7) + 2\times3\times(x – 3) + (x – 3)(x + 7)$ oe **and** must have attempted to expand all the brackets in the numerator **M1** for $10x + 70 + 6x – 18$ **or** $x^2 – 3x + 7x – 21$ **or** [2]$(5x + 35 + 3x – 9)$ or better
20(a)	1480	**1**	
20(b)	30	**3**	**M2** for $10 \times \sqrt{\frac{3960}{440}}$ or $10 \div \sqrt{\frac{440}{3960}}$ or **M1** for $\sqrt{\frac{3960}{440}}$ or $\sqrt{\frac{440}{3960}}$ or $\left(\frac{h}{10}\right)^2 = \frac{3960}{440}$ oe

Question	Answer	Mark	Partial marks
21	46.7 or 46.68 to 46.69	**4**	**M3** for tan […=] $\frac{9}{\frac{1}{2}\sqrt{12^2+12^2}}$ oe or **M1** for $\left[\frac{1}{2}\times\right]\sqrt{12^2+12^2}$ oe e.g. $\sqrt{\frac{12^2}{2}}$ and **M1** for identifying angle *MCE*
22(a)	80 to 84	**2**	**M1** for 116 to 120
22(b)	Correct curve or ruled lines	**3**	**B2** for 7 or 8 correct points **B1** for 5 or 6 correct points
22(c)	26	**2**	**B1** for 156 or 130 or for *their* 130 from *their* **increasing** curve (or lines)
23(a)	$x + y \leqslant 16$ oe $x \geqslant 4$ oe	**2**	**B1** for each mark final answers If zero scored, **SC1** for $x + y < 16$ **and** $x > 4$
23(b)	Correct shading	**3**	**M2** for lines at $x = 4$ **and** $x + y = 16$ or for correct shading of $x < 4$ or $x + y > 16$ or **M1** for line at $x = 4$ or *their* $x = 4$ or for line at $x + y = 16$ or *their* $x + y = 16$
23(c)	144	**2**	**M1** for (8, 8) selected or for $10 \times x + 8 \times y$ for any numerical point which is inside or on the boundary of *their* unshaded region

© UCLES 2017