Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/21**

Paper 2 (Extended) **May/June 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.

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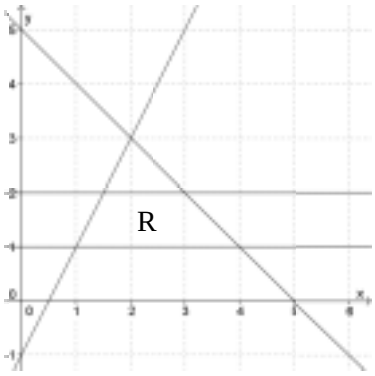
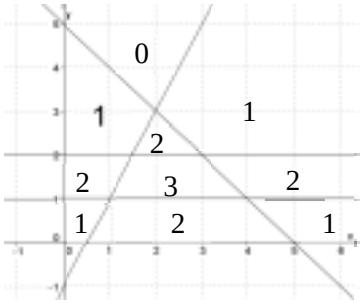
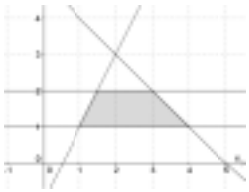
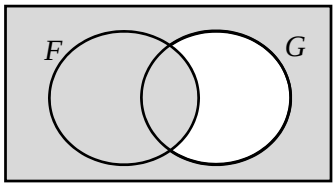
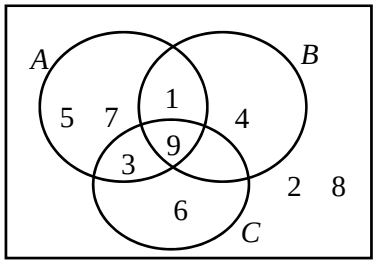
Abbreviations

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	Mark	Part marks
1	x^{10}	**1**	
2	2	**1**	
3(a)	23.46 cao	**1**	
3(b)	20 cao	**1**	
4(a)	Chicago	**1**	
4(b)	−3	**1**	
5	$4n(3n – m)$ final answer	**2**	**B1** for $4(3n^2 – mn)$ or $n(12n – 4m)$ or $2n(6n – 2m)$ or $2(6n^2 – 2mn)$
6(a)	−4	**1**	
6(b)	$\frac{1}{5}$ or 0.2	**1**	
7	$\frac{14\,(\text{or}\,35)}{21} + \frac{15}{21}$	**M1**	accept $\frac{14k\,(\text{or}\,35k)}{21k} + \frac{15k}{21k}$
	$2\frac{8}{21}$ cao	**A2**	or **A1** for $\frac{50}{21}$ or $1\frac{8}{21}$ or $\frac{29}{21}$ or $1\frac{29}{21}$
8	rt $(1 – t)\,r$ $(1 – r)t$ oe $(1 – r)(1 – t)$ oe	**3**	**B1** for each
9	7.65	**3**	**M1** for $h = k\sqrt{p}$ oe **M1** for $h =$ *their* $k\sqrt{p}$ or **M2** for $\frac{5.4}{\sqrt{1.44}} = \frac{h}{\sqrt{2.89}}$ oe

Question	Answer	Mark	Part marks
10	Correct region identified 	**3**	 **SC1** for 
11	76.9 or 76.94 to 76.95	**3**	**M2** for $90 \div \sqrt[3]{\frac{160}{100}}$ or $90 \times \sqrt[3]{\frac{100}{160}}$ or **M1** for $\sqrt[3]{\frac{160}{100}}$ soi or $\sqrt[3]{\frac{100}{160}}$ soi or $\left(\frac{h}{90}\right)^3 = \frac{100}{160}$ oe
12	$k - 3$ or $-3 + k$	**3**	**M1** for $5 = \frac{23-8}{k-x}$ oe **M1** for $5(k - x) = 23 - 8$ or better e.g. $[x =]\ k - \frac{23-8}{5}$
13	22.6 or 22.61 to 22.62	**3**	**M2** for sin [=] $\frac{5}{13}$ oe or **M1** for identifying angle *AGE*
14	165	**3**	**M2** for $\frac{360}{8} + \frac{360}{3}$ oe or **M1** for **[**exterior angle of octagon =] $\frac{360}{8}$ or [exterior angle of triangle =] $\frac{360}{3}$ oe
15(a)	0.8 or $\frac{4}{5}$	**1**	
15(b)	1180	**3**	**M2** for **(**0.5 × 16 × 20) + **(**0.5 × 4 × 30) + (80 × 12) oe or **M1** for part area
16(a)	Points plotted at (4.5, 33) and (6.5, 35)	**1**	

Question	Answer	Mark	Part marks
16(b)	Positive	**1**	
16(c)	Correct ruled line	**1**	
16(d)	33.5 to 37.5	**1FT**	**FT** from *their* line providing positive gradient
17(a)		**1**	
17(b)(i)		**2**	**B1** for four out of the eight regions correct
17(b)(ii)	Any even square number that is also a multiple of 3	**1**	
18(a)	2**a** + **b**	**1**	
18(b)	*D*	**1**	
18(c)	$\overrightarrow{CF}$ and $\overrightarrow{BG}$	**2**	**B1** for each
19	5.53 or 5.54 or 5.534 to 5.543…	**4**	**M3** for $2 \times \{(\frac{40}{360} \times \pi \times 10^2) - (\frac{1}{2} \times 10^2 \times \sin 40)\}$ or **M2** for $\left[\frac{1}{2}\times\right] 10^2 \times \sin 40$ and $[2\times]\frac{40}{360} \times \pi \times 10^2$ or **M1** for $\left[\frac{1}{2}\times\right] 10^2 \times \sin 40$ or $[2\times]\ \frac{40}{360} \times \pi \times 10^2$
20(a)	5 7 7 8 10 7 9 9 10 12	**1**	
20(b)	7	**1**	

Question	Answer	Mark	Part marks
20(c)(i)	$\frac{7}{25}$ or 0.28 or 28%	**2FT**	**FT** $\frac{their\ 7}{25}$ **B1** for $\frac{k}{25}$ If zero scored, then **SC1** for $\frac{2}{5}$ or $\frac{6}{15}$ if no values in the bottom two rows of the table.
20(c)(ii)	0	**1FT**	**FT** $\frac{their\ 0}{25}$
21(a)	[u =] 35	**1**	
	[v =] 110	**2**	**B1** for *ACB* or *ADB* = 35
21(b)	75	**2**	**B1** for 150 or **M1** for $\frac{360-210}{2}$
22(a)	$\frac{x}{x+3}$ final answer	**3**	**B1** for $x(x-3)$ **B1** for $(x-3)(x+3)$
22(b)	$\frac{8x+7}{(x-4)(2x+5)}$ final answer	**3**	**B1** for common denominator of $(x-4)(2x+5)$ oe **M1** for $3(2x+5)+2(x-4)$ oe with an attempt to expand the brackets