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

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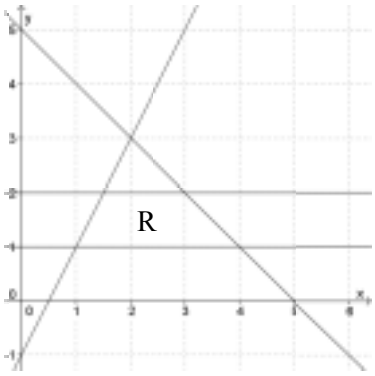
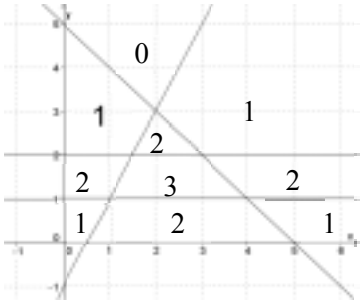
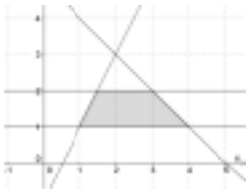
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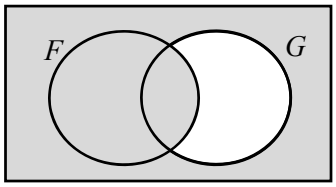
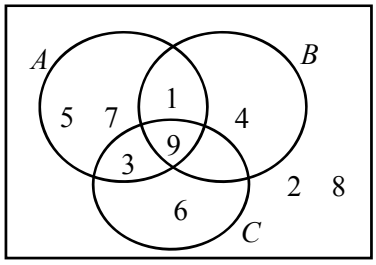
Abbreviations

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**	

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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)	$2\mathbf{a} + \mathbf{b}$	**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**	

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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

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