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**MATHEMATICS**

**0580/21**

Paper 2 (Extended)

**May/June 2017**

MARK SCHEME

Maximum Mark: 70

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**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.

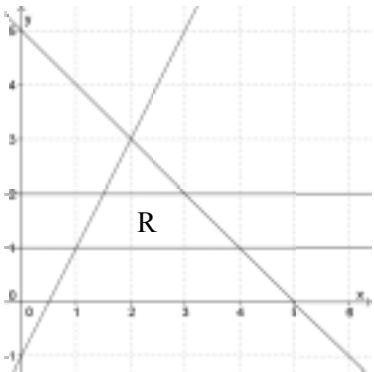
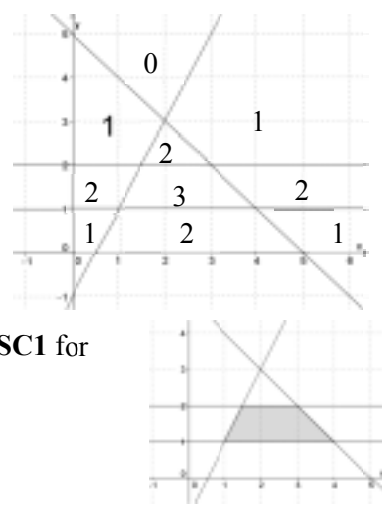
Cambridge will not enter into discussions about these mark schemes.

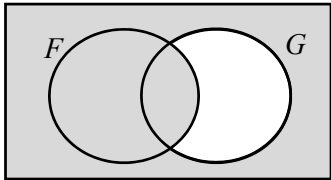
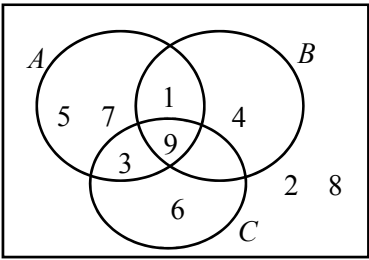
Cambridge is publishing the mark schemes for the May/June 2017 series for most Cambridge IGCSE<sup>®</sup>, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

## 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	<b>B1</b> 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	$\frac{14(\text{or } 35)}{21} + \frac{15}{21}$	<b>M1</b>	accept $\frac{14k(\text{or } 35k)}{21k} + \frac{15k}{21k}$				
	$2\frac{8}{21}$ cao	<b>A2</b>	or <b>A1</b> for $\frac{50}{21}$ or $1\frac{8}{21}$ or $\frac{29}{21}$ or $1\frac{29}{21}$				
8	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td><math>rt</math></td></tr> <tr><td><math>(1 - t)r</math></td></tr> <tr><td><math>(1 - r)t</math> oe</td></tr> <tr><td><math>(1 - r)(1 - t)</math> oe</td></tr> </table>	$rt$	$(1 - t)r$	$(1 - r)t$ oe	$(1 - r)(1 - t)$ oe	3	<b>B1</b> for each
$rt$							
$(1 - t)r$							
$(1 - r)t$ oe							
$(1 - r)(1 - t)$ oe							
9	7.65	3	<b>M1</b> for $h = k\sqrt{p}$ oe <b>M1</b> for $h = \text{their } k\sqrt{p}$ or <b>M2</b> 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	<b>M2</b> for $90 \div \sqrt[3]{\frac{160}{100}}$ or $90 \times \sqrt[3]{\frac{100}{160}}$ or <b>M1</b> 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	<b>M1</b> for $5 = \frac{23-8}{k-x}$ oe <b>M1</b> 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	<b>M2</b> for $\sin [=] \frac{5}{13}$ oe or <b>M1</b> for identifying angle $AGE$
14	165	3	<b>M2</b> for $\frac{360}{8} + \frac{360}{3}$ oe or <b>M1</b> 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	<b>M2</b> for $(0.5 \times 16 \times 20) + (0.5 \times 4 \times 30) + (80 \times 12)$ oe or <b>M1</b> 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 <i>their</i> line providing positive gradient										
17(a)		1											
17(b)(i)		2	<b>B1</b> 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)	$2a + b$	1											
18(b)	$D$	1											
18(c)	$\overline{CF}$ and $\overline{BG}$	2	<b>B1</b> for each										
19	5.53 or 5.54 or 5.534 to 5.543...	4	<b>M3</b> for $2 \times \left\{ \left( \frac{40}{360} \times \pi \times 10^2 \right) - \left( \frac{1}{2} \times 10^2 \times \sin 40 \right) \right\}$ or <b>M2</b> for $\left[ \frac{1}{2} \times \right] 10^2 \times \sin 40$ and $[2 \times] \frac{40}{360} \times \pi \times 10^2$ or <b>M1</b> 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)	<table border="1"> <tr> <td>5</td> <td>7</td> <td>7</td> <td>8</td> <td>10</td> </tr> <tr> <td>7</td> <td>9</td> <td>9</td> <td>10</td> <td>12</td> </tr> </table>	5	7	7	8	10	7	9	9	10	12	1	
5	7	7	8	10									
7	9	9	10	12									
20(b)	7	1											

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