Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/21**

Paper 2 (Extended) **October/November 2016**

MARK SCHEME

Maximum Mark: 70

Published

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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	–7	**1**	
2 (a)	[0].0402	**1**	
(b)	[0].040	**1**	
3	[0].67	**2**	**M1** for 14 × 0.905 [–12] or 12.67 If zero scored, **SC1** for answer [0].74[0]
4	$\frac{8}{12}$ and $\frac{3}{12}$ oe $\frac{5}{12}$ cao	**M1** **A1**	Correct fractions with common denominator
5 (a)	$\frac{1}{125}$	**1**	
(b)	4.56×10^{-3}	**1**	
6	42	**2**	**M1** for $Q = 90$ or $WPQ = 90 - 42$ or $WPQ = 48$
7	$\frac{x^2 + 2y^2}{xy}$ or $\frac{x}{y} + \frac{2y}{x}$ final answer	**2**	**B1** for $xy(x^2 + 2y^2)$ or **M1** for $\frac{x^2y + 2y^3}{xy^2}$ or $\frac{x^3 + 2xy^2}{x^2y}$
8	$\frac{pt - 2t - 3p}{pt}$ final answer	**2**	**B1** for $pt - 2t - 3p$ or $1 - \frac{2t + 3p}{pt}$
9	[x =] 55 [y =] 125	**1** **1FT**	correct or **FT** (180 – their x)

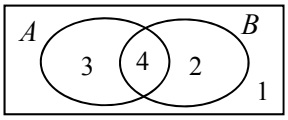
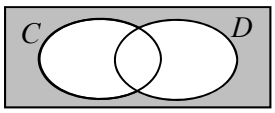
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Question	Answer	Mark	Part marks
10	$6x^8$ final answer	**2**	**B1** for $6x^k$, $6\times x^8$ or $kx^8\ (k\neq 0)$ as final answer
11	Correctly eliminating one variable $[x\ =]\ -1$ and $[y\ =\ ]\ 5$	**M1** **A1** **A1**	If zero scored, **SC1** for 2 values that satisfy one of the original equations **or** **SC1** if no working shown, but 2 correct answers given
12 (a)	$\frac{1}{8}$ cao	**1**	
(b)	$\frac{2}{11}$	**2**	**M1** for $18.\dot{1}\dot{8}-0.\dot{1}\dot{8}$ oe or **B1** for $\frac{2k}{11k}$ (k not 0 or 1)
13 (a)	$(2p-3)(2p+3)$ final answer	**1**	
(b)	$(a-2b)(2x-y)$ oe final answer	**2**	**B1** for $2x(a-2b)-y(a-2b)$ or $a(2x-y)-2b(2x-y)$
14	$6\frac{2}{3}$ oe	**3**	**M1** for $y=k\sqrt{x+2}$ oe or better e.g. $2=k\sqrt{7+2}$ **M1** for $[y=\ ]$ their $k\times\sqrt{98+2}$ or **M2** for $\frac{y}{2}=\frac{\sqrt{98+2}}{\sqrt{7+2}}$
15 (a)	$\begin{pmatrix}5\\8\end{pmatrix}$	**1**	
(b)	(8) final answer	**2**	**B1** for final answer 8 without brackets

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Question	Answer	Mark	Part marks
16	6.35 or 6.349 to 6.350	**3**	**M2** for $\frac{8}{h} = \sqrt[3]{\frac{0.5}{0.25}}$ oe or **M1** for $\left(\frac{8}{h}\right)^3 = \frac{0.5}{0.25}$ oe or for $\sqrt[3]{\frac{0.5}{0.25}}$ or $\sqrt[3]{\frac{0.25}{0.5}}$ oe
17 (a)	Accurate arc, centre *B*, radius 5 cm meeting both *BA* **and** *BC*	**1**	
(b)	Accurate bisector through angle *B* **with** 2 pairs of correct arcs **and** reaching to at least *AC*	**2**	**B1** for accurate line from *B* to at least *AC* or **M1** for correct arcs
(c)	Correct region identified 	**1**	
18 (a)	4	**2**	**B1** for 25 or –21
(b)	$\sqrt{y-qr}$ oe final answer	**2**	**M1** for $y - qr = p^2$ or **M1** for correctly square rooting *their* function of *y*, *q* and *r*
19 (a)	$6n + 1$ oe final answer	**2**	**B1** for $6n + c$ or for $kn + 1$ ($k \neq 0$)
(b)	$(n+2)^2$ final answer	**2**	**M1** for any quadratic expression or reaching second difference of 2
20 (a)	$\frac{3mx}{50}$ or $0.06mx$	**2**	**M1** for $m \times x \times 60 \div 1000$ oe
(b)	35	**2**	**M1** for $5 \times x \times 60 \div 1000 = 10.5$ oe or for substituting $m = 5$ in *their* **(a)** and equating to 10.5 oe

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Question	Answer	Mark	Part marks
21	$y \geqslant 0$ and $x \geqslant 1$ oe and $x + y \leqslant 4$ oe	**4**	**SC3** for $y > 0$, $x > 1$ and $x + y < 4$ oe or **B1** for $y \geqslant 0$ **B1** for $x \geqslant 1$ oe and **B2** for $x + y \leqslant 4$ oe or **M1** for grad = –1 soi If **B0** scored for first two **B** marks, **SC1** for $y = 0$ and $x = 1$ or with incorrect inequality sign
22 (a) (i)		**2**	**B1** for $n(A \cap B) = 4$
(ii)	$\frac{2}{10}$ oe	**1FT**	allow correct answer or **FT** $\frac{their\ 2}{10}$
(b)		**1**	
23	$\sqrt{(3)^2 - 4(2)(-3)}$ oe or better	**B1**	If completing the square, **B1** for $\left(x + \frac{3}{4}\right)^2$ oe
	$\frac{-3 + \sqrt{k}}{2(2)}$ or $\frac{-3 - \sqrt{k}}{2(2)}$ oe	**B1**	**B1** for $-\frac{3}{4} + \sqrt{\frac{3}{2} + \left(\frac{3}{4}\right)^2}$ or $-\frac{3}{4} - \sqrt{\frac{3}{2} + \left(\frac{3}{4}\right)^2}$ oe
	–2.19, 0.69	**B1B1**	**SC1** for –2.2 or –2.186… **and** 0.7 or 0.686.. or –2.19 **and** 0.69 seen but not final answer or 2.19 **and** –0.69 **Maximum score without working is 2**
24 (a)	13.9 or 13.85 to 13.86	**3**	**M2** for $\sqrt{8^2 + 8^2 + 8^2}$ oe or **M1** for $8^2 + 8^2$ or better for one face
(b)	35.1 to 35.5[4…]	**2**	**M1** for sin = $\frac{8}{their\ \textbf{(a)}}$ or cos = $\frac{\sqrt{8^2 + 8^2}}{their\ \textbf{(a)}}$ or tan = $\frac{8}{\sqrt{8^2 + 8^2}}$ oe

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