CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/41 Paper 4 (Extended), maximum raw mark 120

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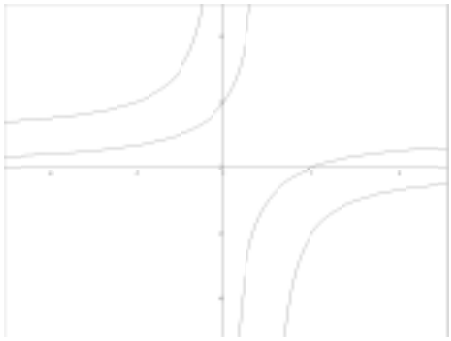
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Abbreviations

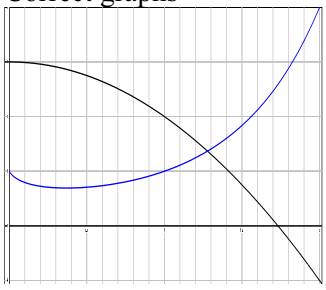
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
nfww not from wrong working
soi seen or implied

Question	Answer	Mark	Part Marks
1 (a)	16 : 15	**1**	
(b) (i)	30	**1**	
(ii)	24.3[0] or 24.29 to 24.30	**4**	**M3** for $50 \times 1.02^{20} - 50$ or **M2** for 50×1.02^{20} or **M1** for 50×1.02^{n} , $n \geqslant 2$oe
(c) (i)	48	**2**	**M1** for $75 \times (0.8)^2$ oe
(ii)	13	**3**	**B2** for answer 12.13 to 12.14 or **M1** for $75 \times 0.8^{n} = 5$ oe
2 (a) (i)	$\begin{pmatrix} 46 \\ 30 \end{pmatrix}$	**2**	**B1** each component **SC1** for $\left(\frac{46}{30}\right)$
(ii)	13	**3**	**M2** for $\sqrt{12^2 + 5^2}$ or **M1** 14 – 2 and 8 – 3 or better seen
(b)	[u =] –2 [v =] 0	**1** **1**	
(c) (i)	Image at (1, –3), (1, –6), (2, –6)	**3**	**SC2** for rotation about (–1, –1) 90° anti-clockwise or **SC1** for rotation 90° clockwise with different centre
(ii)	Reflection $x = -1$	**1** **1**	
(iii)	Stretch [factor] 4 invariant x-axis oe	**1** **1** **1**	

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Question	Answer	Mark	Part Marks
3 (a),(d)		2	**M1** for inaccurate rectangular hyperbola but with correct orientation.
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(b)	$0 < x < 2$ oe	2	**B1** for $0 < x$ oe or $x < 2$ oe
(c)	$\frac{2}{1-x}$ oe	3	**M1** for correct and appropriate rearrangement **M1** for correct multiplication **M1** for correct changing x and y **M1** for correct division **If answer incorrect maximum possible is M2**
(e)	Reflection $y = x$	1 1	
4 (a)	6.75	2	**M1** for $\frac{4}{9} = \frac{3}{CX}$ oe or better
(b)	3	2	**M1** for $\frac{8}{6} = \frac{4}{RY}$ oe or better
(c)	8.49 or 8.484 to 8.485…	3	**M2** for $\frac{12}{w} = \sqrt{\frac{90}{45}}$ oe or better or **M1** for $\sqrt{\frac{90}{45}}$ or $\sqrt{\frac{45}{90}}$ oe soi or $\left(\frac{12}{w}\right)^2 = \frac{90}{45}$ oe
5 (a)	9.83 or 9.829 to 9.830	2	**M1** for $\frac{BC}{12} = \cos 35$ or better
(b)	59.2 or 59.16 to 59.17	3	**M2** for [cos=] $\frac{12^2 + 10^2 - 11^2}{2 \times 12 \times 10}$ or **M1** for $11^2 = 12^2 + 10^2 - 2 \times 12 \times 10 \cos\theta$
(c)	85.3 or 85.4 or 85.34 to 85.37	3	**M1** for $0.5 \times 12 \times \textit{their } BC \times \sin 35$ oe **M1** for $0.5 \times 12 \times 10 \times \sin(\textit{their } CAD)$ oe

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Question	Answer	Mark	Part Marks
6 (a)	1.31 or 1.308…	**2**	**M1** for mid-values soi
(b)	Fully correct histogram	**3**	**B1** for correct widths 0.2, 0.2, 0.2, 0.4 **B2** for 4 correct heights or **B1** for 2 or 3 correct heights or for 180, 200, 160, 20 seen
7 (a) (i)	2512 final answer	**2**	**M1** for $20 \times 8 \times 2 \times 7.85$
(ii)	34.56 cao	**3**	**M2** for $2(20 \times 8 + 20 \times 2 + 8 \times 2) \times 0.08$ oe or **M1** for $2(20 \times 8 + 20 \times 2 + 8 \times 2)$ oe or for area $\times 0.08$
(b)	48	**2**	**M1** for $8 \times 3 \times 2$ oe
(c) (i)	67	**3**	**M2** for $(20 \times 12 \times 4) \div \left(\frac{4}{3}\pi \times 1.5^3\right)$ or **M1** for $\left(\frac{4}{3}\pi \times 1.5^3\right)$
(ii)	12.6 or 12.7 or 12.8 or 12.62 to 12.82...	**2**	**M1** for $(20 \times 12 \times 4)$ – *their* 67 $\times$ *their* $\left(\frac{4}{3}\pi \times 1.5^3\right)$ oe must be positive
(iii)	1.44 or 1.45 or 1.444 to 1.452 cao	**2**	**M1** for $\frac{4}{3}\pi r^3 = \textit{their}(\textbf{ii})$ oe or better
(d)	$\frac{3}{8}$	**4**	**B3** for equivalent fraction or 0.375 **SC2** for answer $\frac{3}{16}$ or **M1** for $\frac{1}{3}\pi r^2 \times 3r \times 0.9$ and **M1** for $\left[\frac{1}{2}\right] \times \frac{4}{3}\pi(2r)^3 \times 0.45$
8 (a)	Correct graphs 	**2** **2**	**B1** for inaccurate parabola **B1** for correct shape but inaccurate
(b)	1.28 or 1.277 to 1.278	**1**	

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Question	Answer	Mark	Part Marks
(c)	1.73 or 1.732…	1	
(d) (i)	0.368 or 0.3678 to 0.3679	1	
	0.692 or 0.6922…	1	**SC1** for (0.37, 0.69)
(ii)	$0.692 \leqslant y \leqslant 4$ oe	2FT	**B1FT** for $0.692 \leqslant y$ oe or **B1** for $y \leqslant 4$ oe or **B1FT** for 0.692 and 4 **SC1FT** for $0.692 < y < 4$
(e) (i)	0.794 or 0.7943…	1	
	0.955 or 0.9549 to 0.9550	1	
	0.993 or 0.9931…	1	
(ii)	1	1	
9 (a) (i)	$\frac{3}{36}$ oe	2	**M1** for $\frac{1}{6} \times \frac{3}{6}$ oe
(ii)	$\frac{5}{36}$ oe	3	**M2** for $\frac{1}{6} \times \frac{2}{6} + \frac{3}{6} \times \frac{1}{6}$ oe or **M1** for $\frac{1}{6} \times \frac{2}{6}$ or $\frac{3}{6} \times \frac{1}{6}$ oe or for list or space diagram showing at least 3 combinations
(b)	$\frac{128}{1296}$ oe	2	**M1** for $\frac{4}{6} \times \frac{4}{6} \times \frac{4}{6} \times \frac{2}{6}$ oe
(c)	6	2	**M1** for $\left(\frac{5}{6}\right)^k \times \frac{1}{6}$ or **SC1** for answer 5
10 (a)	5	2	**M1** for [h(9)=] 1 or for $2(\log(x+1))+3$
(b)	$2x + 2$ or $2(x + 1)$	2	**M1** for $2x + 3 - 1$
(c)	$\frac{3x+2}{(2x+3)(x-1)}$ oe final answer	3	**B1** for denominator $(2x + 3)(x - 1)$ oe **B1** for $x - 1 + 2x + 3$ as numerator
(d)	$-\frac{9}{10}$ oe	2	**M1** for $x+1=10^{-1}$ oe or appropriate sketch

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Question	Answer	Mark	Part Marks
(e)	$1 \pm \sqrt{5}$ final answer cao	**3**	**B2** for $x-1=\sqrt{5}$ or $x-1=-\sqrt{5}$ or $\frac{2 \pm \sqrt{20}}{2}$ oe or for –1.24 (or –1.236...) **and** 3.24 (or 3.236...) or **M1** for $(x-1)^2=5$ oe
11 (a)	2.79 cao nfww 6	**6**	**B1** for $2x + y = 157$ oe **B1** for $x + 3y = 296$ oe **M1** for eliminating one variable or appropriate sketch **B1** for [x =] 35 oe **B1** for [y =] 87 oe or **M1** for x and y working in one equation
(b)	3 nfww 4	**4**	**M2** for $\frac{24}{x}+\frac{24}{x+5}=11$ oe or **B1** for $\frac{24}{x}$ or $\frac{24}{x+5}$ **M1** for full method e.g. sketch of graph showing solution or quadratic with correct factors or $\frac{-7 \pm \sqrt{7^2-4(11)(-120)}}{2\times 11}$ **Note that $x + x + 5 = 11$ is wrong working**

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