CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/43 Paper 4 (Extended), maximum raw mark 120

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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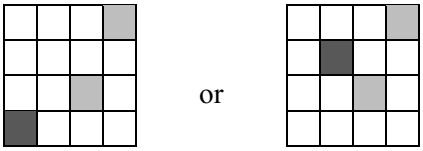
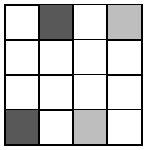
CAMBRIDGE
International Examinations

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

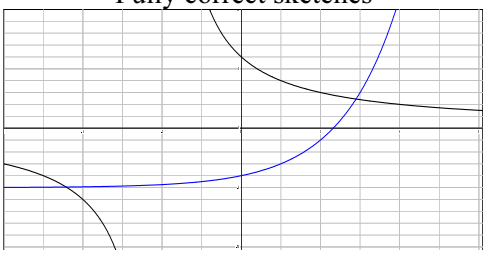
Question	Answer	Mark	Part Marks
1 (a)	9.84 or 9.840 to 9.841	**2**	**M1** for $\sin 41 = \frac{BD}{15}$ oe or better
(b)	83.6 or 83.64 to 83.65	**2**	**M1** for $0.5 \times 17 \times$ *their* **(a)** oe
(c)	$17^2 + 15^2 - 2 \times 17 \times 15 \cos 41$ 129 or 129.0 to 129.1 11.4 or 11.36…	**M1** **A1** **A1**	 If 0 scored **SC2** for 11.4 or 11.36…
2 (a)	27.3 or 27.27…	**3**	**M2** for $\frac{220-160}{220} \times 100$ oe or **M1** for $\frac{220-160}{220}$ oe or $\frac{160}{220} \times 100$ oe
(b)	240	**3**	**M2** for $216 \div 0.9$ oe or **M1** for $216 = 90\%$
(c) (i)	1190 or 1186 or 1185. …	**3**	**M2** for 2180×0.97^{20} oe or **M1** for 2180×0.97^{k} k integer > 1 oe
(ii)	26	**2**	**M1** for $2180 \times 0.97^{n} = 1000$ oe If 0 scored, **SC1** for answer 25
3 (a) (i)	$60 < v \leqslant 70$	**1**	
(ii)	65.9 or 65.93 to 65.94	**2**	**M1** for at least 3 correct mid-values seen
(iii)	0.1, 2.5, 4.6, 8.2, 0.4 oe	**3**	**B2** for 3 or 4 correct or **B1** for 2 correct
(b)	$-0.286r + 35.4$ or $(-0.2861\ldots)r +$ (35.38 to 35.39)	**2**	**B1** for $(-0.286$ or $-0.2861\ldots)r + k$ or for $kr +$ (35.4 or 35.38 to 35.39) or **SC1** for $-0.29r + 35$

Question	Answer	Mark	Part Marks
4 (a) (i)	 or	1	
(ii)		1	
(b) (i)	7	2	**M1** for $\frac{3}{2} = \frac{10.5}{RQ}$ oe or better
(ii)	20	2	**M1** for $\left(\frac{3}{2}\right)^2$ or $\left(\frac{2}{3}\right)^2$ oe
5 (a) (i)	Enlargement [factor] 0.5 oe [centre] (0, 8)	1 1 1	
(ii)	Enlargement [factor] 2 and [centre] (0, 8)	1 1FT	**FT** scale factor and centre
(b) (i)	Image at (4, 4), (8, 4), (8, 6)	2	**M1** for $y = x$ drawn
(ii)	Image at (6, 8), (6, 6), (10, 6)	2	**SC1** for 90° anti-clockwise but different centre
(c)	Reflection, x-axis oe	3	**M2** for full method seen i.e. diagram or unit vectors. or **M1** for one of transformations correctly carried out If 0 scored, **SC1** for any reflection in answer

Question	Answer	Mark	Part Marks
6 (a)	6280 or 6283 to 6284	3	**M2** for $\frac{2}{3}\times\pi\times10^2\times30$ oe or **M1** for $\left[\frac{1}{3}\right]\pi\times10^2\times30\ (1000\pi)$
(b) (i)	$\frac{1}{3}\times\pi\times10^2\times30-\frac{1}{3}\times\pi\times5^2\times15$ oe	M3	Allow use of *their* volume of cone from **(a)** or $\frac{7}{8}\times\frac{1}{3}\times\pi\times10^2\times30$ or $\frac{7}{8}$ *their* volume of cone from **(a)** **M2** for $\frac{1}{3}\times\pi\times5^2\times15$ oe or **B1** for radius of small cone = 5
	2748.8 to 2749.3	A1	**not 2749 alone**
(ii)	1.96 or 1.963 to 1.964	3	**B2** for 1960 or 1963 to 1964 or **M1** for $\pi\times10^2\times15-2749$ **M1** for correctly converting *their* volume in cc to litres.
7 (a)	3.56 or 3.555 to 3.556	3	**M2** for $\frac{10+6}{\frac{10}{4}+\frac{6}{3}}$ or **M1** for $\frac{10}{4}$ or $\frac{6}{3}$
(b)	$\frac{5x-4}{5}$ or $x-0.8$ or $x-\frac{4}{5}$ or $0.2(5x-4)$ final answer nfww	4	**M3** for $\frac{x\times\frac{45}{60}+(x-2)\times\frac{30}{60}\text{ oe}}{\frac{45}{60}+\frac{30}{60}\text{ oe}}$ or **M2** for $x\times\frac{45}{[60]}+(x-2)\times\frac{30}{[60]}$ oe or **M1** for one of these products or evidence of total distance ÷ total time

Question	Answer	Mark	Part Marks
8 (a) (i)	$x > -7$ oe	3	**M2** for $2x - 5x < 15 + 6$ or better or **B1** for $2x - 6$ or $5x + 15$
(ii)	Line with empty circle at –7 and arrow to right	1FT	**Strict FT, must be from an inequality.**
(b)	Sketch of $y = (x + 3)^2 + (x + 1)^2 - 25$ oe	M2	**M1** for sketch of $(x + 3)^2 + (x + 1)^2$
	or	or	
	$2x^2 + 8x - 15 = 0$	B2	**B1** for $x^2 + 3x + 3x + 9$ or $x^2 + x + x + 1$ oe
	–5.39 **and** 1.39	B4	**B3** for –5.391... **and** 1.391... or **B2** for –5.39 **or** 1.39 or **B1** for –5.391... **or** 1.391... or **M1** for sketch of parabola or correct substitution in formula or reaching $2(x+2)^2 - 23$ oe
(c) (i)	Appropriate sketch which could lead to answer	M2	**M1** for correct sketch of log$x$ or other equation containing log$x$
	4.36 or 4.360…	B1	
(ii)	4.36 or 4.360… 5.76 or 5.760…	B1FT B1	
(d)	$\frac{x^2 - x + 2}{(x-1)(x+1)}$ oe final answer	3	**B1** for $x(x+1) - 2(x-1)$ oe seen **B1** for denominator $(x-1)(x+1)$ oe
9 (a)	127	3	**M1** for angle ADB or ABD $= 0.5(180 - 124)$ implied by 28 in diagram **M1** for angle DBC = angle ADB.
(b)	162	3	**M2** for $(10 - 2) \times 180 - 9 \times 142$ or **M1** for $(10 - 2) \times 180$
(c) (i)	65	2	**B1** for angle $ADB = 25$ or angle $ACD = 65$
(ii)	70	2	**B1** for angle $BAC = 20$ or angle $FDC = 70$
(iii)	85	1	

Question	Answer	Mark	Part Marks
10 (a)	$\frac{1}{3}$	**1**	
	$\frac{2}{5}$	**1**	
	$\frac{1}{10}$ and $\frac{9}{10}$	**1**	
(b)	$\frac{2}{3}\times\frac{3}{5}+\frac{1}{3}\times\frac{1}{10}$	**M2**	**M1** for one of these **FT** from **(a)**
(c)	$\frac{17}{30}$ and $\frac{12}{13}$	**1**	
	$\frac{8}{17}$ and $\frac{9}{17}$	**2**	**M1** for $\frac{17}{30}\times x=\frac{9}{30}$ oe
11 (a)	8	**1**	
(b)	2, 1	**1**	
(c)	–6 and 2	**4**	**B3** for $(x-6)(x+2)$ or **SC3** for 6 and –2 or **B2** for $x^2-2x-2x+4-16$ or better or **M1** for $(x-2)^2-16$ or for $x^2+ax+bx+ab$
(d) (i)	$\frac{2-x}{x}$ oe final answer	**3**	**M1** for interchanging x and y **M1** for a correct multiplication **M1** for a correct rearrangement and a correct division **If answer incorrect maximum possible is M2**
(ii)	$\log_2 x$ or $\frac{\log x}{\log 2}$	**2**	**M1** for $\log y = x\log 2$ or $\log_2 y = x$ oe or $x=2^y$
(e)	Stretch [factor] 2 and x-axis invariant	**1** **1**	

Question	Answer	Mark	Part Marks
12 (a)	Fully correct sketches 	2	**B1** for rectangular hyperbola with correct orientation but inaccurate
		2	Correct curve crossing positive x-axis and negative y-axis **B1** for exponential curve with correct orientation but inaccurate
(b) (i)	$x = -2$	1	
	$y = 0$	1	
(ii)	$y = -5$	1	
(c)	$x > 2.9[0]$ or $2.897\ldots$	2	**B1** for $2.9[0]$ or $2.897\ldots$ seen