

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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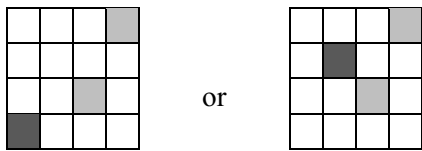
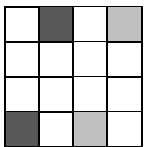
Cambridge is publishing the mark schemes for the October/November 2015 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O Level components.

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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
nfw	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 $0.5 \times 17 \times \text{their (a)}$ 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)	$60 < v \leq 70$	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 $(-0.2861\dots)r + (35.38 \text{ to } 35.39)$	2	B1 for $(-0.286 \text{ or } -0.2861\dots)r + k$ or for $kr + (35.4 \text{ or } 35.38 \text{ to } 35.39)$ or SC1 for $-0.29r + 35$

Question	Answer	Mark	Part Marks	
4	(a) (i)		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

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Question	Answer	Mark	Part Marks
6 (a)	6280 or 6283 to 6284	3	M2 for $\frac{2}{3} \times \pi \times 10^2 \times 30$ oe or M1 for $\left[\frac{1}{3}\right] \pi \times 10^2 \times 30$ (1000π)
(b) (i)	$\frac{1}{3} \times \pi \times 10^2 \times 30 - \frac{1}{3} \times \pi \times 5^2 \times 15$ oe	M3	Allow use of <i>their</i> volume of cone from (a) or $\frac{7}{8} \times \frac{1}{3} \times \pi \times 10^2 \times 30$ or $\frac{7}{8}$ <i>their</i> volume of cone from (a) M2 for $\frac{1}{3} \times \pi \times 5^2 \times 15$ oe or B1 for radius of small cone = 5
(ii)	2748.8 to 2749.3 1.96 or 1.963 to 1.964	A1 3	not 2749 alone B2 for 1960 or 1963 to 1964 or M1 for $\pi \times 10^2 \times 15 - 2749$ M1 for correctly converting <i>their</i> 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 nfw	4	M3 for $\frac{x \times \frac{45}{60} + (x-2) \times \frac{30}{60}}{\frac{45}{60} + \frac{30}{60}}$ 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 \div total time

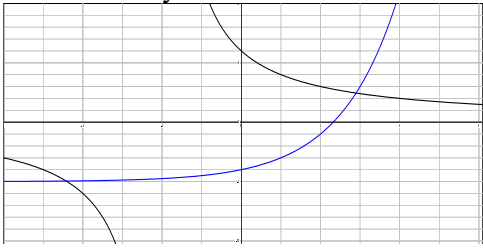
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Question	Answer	Mark	Part Marks
8	(a) (i) $x > -7$ oe	3	M2 for $2x - 5x < 15 + 6$ or better or B1 for $2x - 6$ or $5x + 15$
	(ii) Line with empty circle at -7 and arrow to right	1FT	Strict FT, must be from an inequality.
	(b) Sketch of $y = (x + 3)^2 + (x + 1)^2 - 25$ oe	M2	M1 for sketch of $(x + 3)^2 + (x + 1)^2$
	or $2x^2 + 8x - 15 = 0$	or B2	B1 for $x^2 + 3x + 3x + 9$ or $x^2 + x + x + 1$ oe
	-5.39 and 1.39	B4	B3 for $-5.391\dots$ and $1.391\dots$ or B2 for -5.39 or 1.39 or B1 for $-5.391\dots$ or $1.391\dots$ 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 4.36 or $4.360\dots$	M2 B1	M1 for correct sketch of $\log x$ or other equation containing $\log x$
(ii) 4.36 or $4.360\dots$ 5.76 or $5.760\dots$	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 $DBC = \text{angle } ADB$.
	(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	

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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	
(c)	$\frac{17}{30}$ and $\frac{12}{13}$	1	M1 for $\frac{17}{30} \times x = \frac{9}{30}$ oe
	$\frac{8}{17}$ and $\frac{9}{17}$	2	
11 (a)	8	1	<p>B3 for $(x - 6)(x + 2)$ or SC3 for 6 and -2</p> <p>or B2 for $x^2 - 2x - 2x + 4 - 16$ or better or M1 for $(x - 2)^2 - 16$ or for $x^2 + ax + bx + ab$</p> <p>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</p> <p>M1 for $\log y = x \log 2$ or $\log_2 y = x$ oe or $x = 2^y$</p>
(b)	2, 1	1	
(c)	-6 and 2	4	
(d) (i)	$\frac{2-x}{x}$ oe final answer	3	
(ii)	$\log_2 x$ or $\frac{\log x}{\log 2}$	2	
(e)	Stretch [factor] 2 and x -axis invariant	1 1	

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Question	Answer	Mark	Part Marks
12 (a)	<p>Fully correct sketches</p> 	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 $2.897\dots$	2	B1 for $2.9[0]$ or $2.897\dots$ seen