

**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

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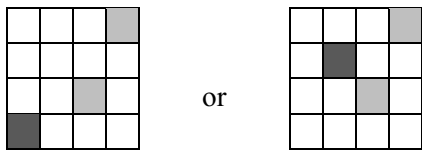
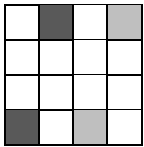
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### Abbreviations

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

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

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

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6 (a)	6280 or 6283 to 6284	3	<b>M2</b> for $\frac{2}{3} \times \pi \times 10^2 \times 30$ oe or <b>M1</b> for $\left[\frac{1}{3}\right] \pi \times 10^2 \times 30$ ( $1000\pi$ )
(b) (i)	$\frac{1}{3} \times \pi \times 10^2 \times 30 - \frac{1}{3} \times \pi \times 5^2 \times 15$ oe	<b>M3</b>	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)  <b>M2</b> for $\frac{1}{3} \times \pi \times 5^2 \times 15$ oe  or <b>B1</b> for radius of small cone = 5
(ii)	2748.8 to 2749.3 1.96 or 1.963 to 1.964	<b>A1</b> 3	<b>not 2749 alone</b>  <b>B2</b> for 1960 or 1963 to 1964 or <b>M1</b> for $\pi \times 10^2 \times 15 - 2749$ <b>M1</b> for correctly converting <i>their</i> volume in cc to litres.
7 (a)	3.56 or 3.555 to 3.556	3	<b>M2</b> for $\frac{10+6}{\frac{10}{4} + \frac{6}{3}}$ or <b>M1</b> 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	<b>M3</b> for $\frac{x \times \frac{45}{60} + (x-2) \times \frac{30}{60}}{\frac{45}{60} + \frac{30}{60}}$ oe or <b>M2</b> for $x \times \frac{45}{[60]} + (x-2) \times \frac{30}{[60]}$ oe or <b>M1</b> for one of these products or evidence of total distance $\div$ total time

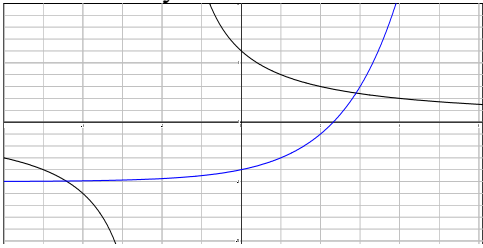
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Question	Answer	Mark	Part Marks
8	(a) (i) $x > -7$ oe	3	<b>M2</b> for $2x - 5x < 15 + 6$ or better or <b>B1</b> for $2x - 6$ or $5x + 15$
	(ii) Line with empty circle at $-7$ and arrow to right	1FT	<b>Strict FT, must be from an inequality.</b>
	(b) Sketch of $y = (x + 3)^2 + (x + 1)^2 - 25$ oe or $2x^2 + 8x - 15 = 0$  $-5.39$ and $1.39$	<b>M2</b>  or <b>B2</b>  <b>B4</b>	<b>M1</b> for sketch of $(x + 3)^2 + (x + 1)^2$  or <b>B1</b> for $x^2 + 3x + 3x + 9$ or $x^2 + x + x + 1$ oe  <b>B3</b> for $-5.391\dots$ and $1.391\dots$ or <b>B2</b> for $-5.39$ or $1.39$ or <b>B1</b> for $-5.391\dots$ or $1.391\dots$  or <b>M1</b> 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 $4.360\dots$	<b>M2</b>  <b>B1</b>	<b>M1</b> for correct sketch of $\log x$ or other equation containing $\log x$
	(ii) $4.36$ or $4.360\dots$ $5.76$ or $5.760\dots$	<b>B1FT</b> <b>B1</b>	
	(d) $\frac{x^2 - x + 2}{(x - 1)(x + 1)}$ oe final answer	3	<b>B1</b> for $x(x + 1) - 2(x - 1)$ oe seen <b>B1</b> for denominator $(x - 1)(x + 1)$ oe
9	(a) 127	3	<b>M1</b> for angle $ADB$ or $ABD$ $= 0.5(180 - 124)$ implied by 28 in diagram <b>M1</b> for angle $DBC = \text{angle } ADB$ .
	(b) 162	3	<b>M2</b> for $(10 - 2) \times 180 - 9 \times 142$ or <b>M1</b> for $(10 - 2) \times 180$
	(c) (i) 65	2	<b>B1</b> for angle $ADB = 25$ or angle $ACD = 65$
	(ii) 70	2	<b>B1</b> 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 <math>(x - 6)(x + 2)</math> or SC3 for 6 and -2</p> <p>or B2 for <math>x^2 - 2x - 2x + 4 - 16</math> or better or M1 for <math>(x - 2)^2 - 16</math> or for <math>x^2 + ax + bx + ab</math></p> <p>M1 for interchanging <math>x</math> and <math>y</math> 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 <math>\log y = x \log 2</math> or <math>\log_2 y = x</math> oe or <math>x = 2^y</math></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	<b>B1</b> for rectangular hyperbola with correct orientation but inaccurate
		2	Correct curve crossing positive $x$ -axis and negative $y$ -axis
			<b>B1</b> 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	<b>B1</b> for $2.9[0]$ or $2.897\dots$ seen