

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

## **MARK SCHEME for the May/June 2014 series**

# **0607 CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/42**

Paper 4 (Extended), maximum raw mark 120

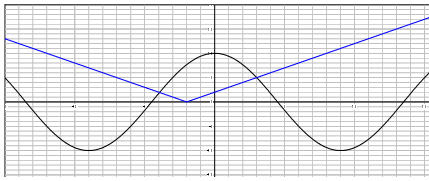
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, 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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

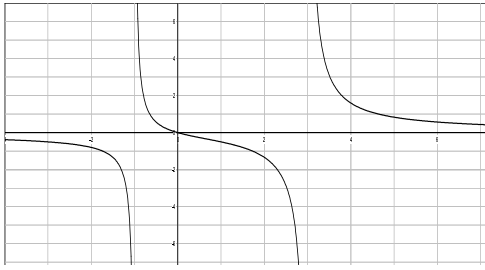
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1	(a)	$8.5 \times 10^6$	1	
	(b)	5.1 million oe	2	<b>M1</b> for $8.5 [\times 10^6] \times 0.95^{10}$ oe soi by figs 509 or 5089...
	(c)	23.7 million oe ( $2.37 \times 10^7$ )	3	<b>M2</b> for $8.5 [\times 10^6] \div 0.95^{20}$ oe soi by figs 237 or 2371... <b>M1</b> for $8.5 [\times 10^6] = a \times 0.95^n$ oe $n$ positive integer
	(d)	78.5 or 78.48 to 78.54	3	<b>M2</b> for $(\text{their } 23.7 \text{ million} - \text{their } 5.1 \text{ million}) \div \text{their } 23.7 \text{ million} \times 100$ or $(1 - 0.95^{30}) \times 100$ oe i.e. full method or <b>M1</b> for $1 - 0.95^{30}$ or $(\text{their } 23.7 \text{ million} - \text{their } 5.1 \text{ million}) \div \text{their } 23.7 \text{ million}$ or $(\text{their } 5.1 \text{ million} \div \text{their } 23.7 \text{ million}) \times 100$
	(e)	2017	3	<b>M2</b> for $\frac{\log(\frac{3.5}{\text{their } 8.5})}{\log 0.95}$ or $\frac{\log(\frac{3.5}{\text{their } 5.1})}{\log 0.95}$ oe or appropriate sketch indicating solution or <b>M1</b> $8.5 \times [10^6] \times 0.95^n = 3.5 \times [10^6]$ oe or powers going beyond 2010 shown or appropriate sketch but not indicating solution <b>SC2</b> for 17.3 or 17.29 to 17.30 or 7.3 or 7.29 to 7.34 or 18 or 2018
2	(a)		3	<b>B1</b> for basic cosine shape <b>B1</b> for amplitude approx correct <b>B1</b> for period approx correct
	(b)	(0, 10) (-9, -10) (9, -10)	1 1 1	
	(c)	Sketch	1	reasonable straight lines meeting at (-2, 0), all the rest above the $x$ -axis and crossing curve twice
	(d)	3 -3.94 or -3.941 to -3.940	1 1	<b>SC1</b> for both correct answers but with $y$ co-ordinates in answer or both correct answers given as an inequality

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3	(a)	Triangle $(-1, 3) (-3, 3) (-3, 4)$	2	<b>B1</b> for $x$ or $y$ movement correct.	
	(b)	Rotation 90 clockwise oe $(1, 7)$	5	<b>B2</b> triangle drawn vertices $(-5, 5) (-5, 7) (-4, 7)$ or <b>SC1 FT</b> for rotation 90 clockwise about other centre <b>then</b> written answers <b>B1</b> Rotation <b>B1</b> 90 clockwise oe <b>B1</b> $(1, 7)$ <b>If more than one transformation, these 3 B1 marks are lost</b>	
4	(a)	27.6 or 27.60 to 27.63	4	<b>M1</b> for $\frac{2}{3} \times \pi \times 1.3^3$ (4.6[0] or 4.601 to 4.602) <b>M1</b> for $\pi \times 1.3^2 \times 3.5$ (18.6 or 18.58...) <b>M1</b> for $\frac{1}{3} \times \pi \times 1.3^2 \times 2.5$ (4.42 or 4.424 to 4.425)	
	(b)	232 or 231.8 to 232.1	1FT	<b>FT</b> <i>their</i> (a) $\times 8.4$	
	(c)	9.2[0] or 9.197...	3	<b>M2</b> for <i>their</i> $(2.5 + 3.5 + 1.3) \times \sqrt[3]{2}$ oe or <b>M1</b> for s.f. = $\sqrt[3]{2}$ oe (1.25992...)	
5	(a)	5 Points plotted	2	$\pm \frac{1}{2}$ small square <b>B1</b> for 3 or 4 correct	
	(b)	Positive	1	Ignore comment on strength	
	(c)	(i)	42.1 or 42.06 to 42.07	1	
		(ii)	29.6	1	
	(d)	$[y =] 0.665x + 1.64$ or 0.6646 to 0.6647 and 1.638 to 1.639	2	<b>B1</b> for either $a$ or $b$ correct or <b>SC1</b> for $0.66x + 1.6$	
	(e)	18.9 or 18.91 to 18.93	1FT	<b>FT</b> <i>their</i> (d)	
	(f)	Correct ruled line	2	<b>M1</b> for line through <i>their</i> mean point plotted or <b>B1</b> for correct freehand line	
(g)	$0.665x + 13.6$ <i>their</i> $(0.665x + 1.64) + 12$ oe	1FT			
6	(a)	$-0.4$ oe	1		
	(b)	$(0, -4)$	1		
	(c)	$2.5x - 2$ oe	3	<b>M1 FT</b> for 2.5 or $-1/$ <i>their</i> (a) <b>M1</b> for substituting $(2, 3)$ into <i>their</i> $y = 2.5x + c$ or $y - 3 = m(x - 2)$	

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7	(a)	12 13 4	2	M1 for $53 - x = 40$ oe or $25 + 17 - x = 29$ oe soi by $25 + 17 - 29$ oe or 13
	(b)	$n(B \cup C)$ oe	1	e.g. $n(B' \cap C)$ isw = any value
	(c)	$\frac{13}{40}$	1FT	FT $\frac{\text{their } 13}{40}$
	(d)	$\frac{11}{130}$ oe	3	M2 for $\frac{\text{their } 12}{40} \times \frac{\text{their } 11}{39}$ or M1 for $\frac{x}{40} \times \frac{x-1}{39}$
	(e)	$\frac{13}{50}$ oe	3	M2 for $\frac{\text{their } 13}{\text{their } 25} \times \frac{\text{their } 12}{\text{their } 24}$ or M1 for $\frac{x}{\text{their } 25} \times \frac{x-1}{\text{their } 24}$
8	(a)		3	B1 for each branch SC2 for correct but branches joined
	(b)	$x = -1$ $x = 3$ $y = 0$	1 1 1	
	(c)	$x < -1$ $-0.886[0\dots] < x < 3$ $x > 3.39$ or $3.386\dots$ )	1 1 1	Condone $\leq$ throughout
	(d)	$\frac{2(x-1)}{(x-4)x}$ oe final answer	2	M1 for clear attempt to substitute $x - 1$ for $x$ at least twice or SC1 for $\frac{2(x+1)}{(x-2)(x+2)}$

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9	(a) (i)	2	1	<p><b>M1</b> for <math>\Sigma fx</math> used (at least 3 correct seen) soi by 240</p>
	(ii)	5	1	
	(iii)	3	1	
	(iv)	3.04 or 3.037 to 3.038	2	
	(v)	4	1	
	(b) (i)	Could be e.g. 0.5 to 6.5 or clear equiv	1	
	(ii)	$1.5[< x \leq ]2.5$	1	
10	(a)	$2 = 1^2 + b + c$ oe $-6 = (-3)^2 - 3b + c$ oe	1 1	<p>i.e. correctly eliminating one variable from correct equations</p> <p><b>SC1</b> for <math>-4.646</math> to <math>-4.645</math> <b>and</b> <math>0.645</math> to <math>0.646</math>            If 0 scored <b>M1</b> for correct substitution into formula or correct sketch oe</p>
	(b)	Simplified to $b + c = 1$ and $-3b + c = -15$ oe Subtraction or $1 - b = -15 + 3b$ oe  Completion to $b = 4$ and $c = -3$ with no errors	<b>B1</b> <b>B1</b> 1	
	(c) (i)	$-4.65$ $0.65$	1 1	
	(ii)	$x = -2$ oe final answer	1	
	(iii)	$[y = ] -7$	1	
11	(a) (i)	67	2	<b>B1</b> for $EDC = 90$
	(ii)	29	2	<b>B1</b> for $ACD = 52$ or $90 - 38 - 23$ or $BDE = 29$ or <b>M1</b> for $180 - (180 - 67) - 38$ oe
	(iii)	46	1	
	(b) (i)	4.25 or 4.253 to 4.254	2	<b>M1</b> for $\tan 28 = \frac{PR}{8}$ or $\frac{\sin 62}{8} = \frac{\sin 28}{x}$ oe
	(ii)	124	1	
	(iii)	17.[0] or 17.01 to 17.03	4	<p><b>M3</b> for</p> $\frac{56}{360} \times 2 \times \pi \times 8 + \text{their } \frac{124}{360} \times 2 \times \pi \times \text{their } 4.25$ <p>oe</p> <p>or <b>M1</b> for <math>\frac{56}{360} \times 2 \times \pi \times 8</math> oe</p> <p>and <b>M1</b> for <math>\text{their } \frac{124}{360} \times 2 \times \pi \times \text{their } 4.25</math> oe</p>

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<b>12</b>	<b>(a)</b>	7.53 or 7.533...	<b>3</b>	<b>M2</b> for $\sqrt{(12.6^2 - 10.1^2)}$ oe or <b>M1</b> for $x^2 + 10.1^2 = 12.6^2$ or better
	<b>(b)</b>	95.1 or 95.12...	<b>3</b>	<b>M2</b> for $(12.6^2 + 13.8^2 - 19.5^2) \div (2 \times 12.6 \times 13.8)$ oe (implied by $-0.089285\dots$ ) or <b>M1</b> for $19.5^2 = 12.6^2 + 13.8^2 - 2 \times 12.6 \times 13.8 \cos \theta$
	<b>(c)</b>	$\frac{1}{2} \times 10.1 \times \textit{their} 7.53 + \frac{1}{2} \times 12.6 \times 13.8 \times \sin \textit{their} 95.1$ oe  125 or 124.5 to 124.7	<b>M3</b>  <b>B1</b>	<b>M1</b> for $\frac{1}{2} \times 10.1 \times \textit{their} 7.53$  and <b>M1</b> for $\frac{1}{2} \times 12.6 \times 13.8 \times \sin \textit{their} 95.1$ oe
<b>13</b>	<b>(a)</b>	$\frac{x-4}{60}$ oe	<b>1</b>	
	<b>(b) (i)</b>	$\frac{70x}{60} + \frac{15(x-4)}{60} = 33$ oe  $70x + 15(x-4) = 60 \times 33$ oe or $\frac{85x-60}{60} = 33$  Completion to $17x - 12 = 396$ with no errors	<b>M1</b>  <b>B1</b>  <b>A1</b>	e.g. $14x + 3(x-4) = 33 \times 12$
	<b>(ii)</b>	24	<b>2</b>	<b>B1</b> for $17x = 396 + 12$ or $17x = 408$
	<b>(c)</b>	45	<b>2</b>	<b>M1</b> for $33 \div (20 + \textit{their} 24) \times 60$