

MARK SCHEME for the May/June 2014 series

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/42

Paper 4 (Extended), maximum raw mark 120

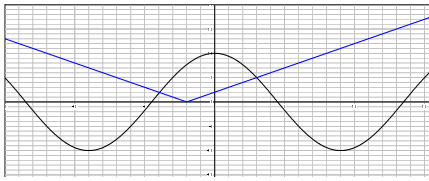
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began,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

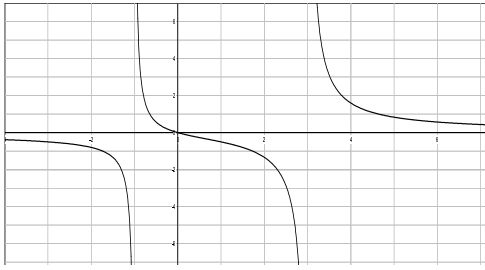
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<p>1</p> <p>(a) 8.5×10^6</p> <p>(b) 5.1 million oe</p> <p>(c) 23.7 million oe (2.37×10^7)</p> <p>(d) 78.5 or 78.48 to 78.54</p> <p>(e) 2017</p>		<p>1</p> <p>2</p> <p>3</p> <p>3</p> <p>3</p>	<p>M1 for $8.5 [\times 10^6] \times 0.95^{10}$ oe soi by figs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

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3	(a) Triangle $(-1, 3)$ $(-3, 3)$ $(-3, 4)$ (b) Rotation 90 clockwise oe $(1, 7)$	2 5	B1 for x or y movement correct. B2 triangle drawn vertices $(-5, 5)$ $(-5, 7)$ $(-4, 7)$ or SC1 FT for rotation 90 clockwise about other centre then written answers B1 Rotation B1 90 clockwise oe B1 $(1, 7)$ If more than one transformation, these 3 B1 marks are lost
4	(a) 27.6 or 27.60 to 27.63 (b) 232 or 231.8 to 232.1 (c) 9.2[0] or 9.197...	4 1FT 3	M1 for $\frac{2}{3} \times \pi \times 1.3^3$ (4.6[0] or 4.601 to 4.602) M1 for $\pi \times 1.3^2 \times 3.5$ (18.6 or 18.58...) M1 for $\frac{1}{3} \times \pi \times 1.3^2 \times 2.5$ (4.42 or 4.424 to 4.425) 1FT FT <i>their</i> (a) $\times 8.4$ 3 M2 for <i>their</i> $(2.5 + 3.5 + 1.3) \times \sqrt[3]{2}$ oe or M1 for s.f. = $\sqrt[3]{2}$ oe (1.25992...)
5	(a) 5 Points plotted (b) Positive (c) (i) 42.1 or 42.06 to 42.07 (ii) 29.6 (d) $[y =] 0.665x + 1.64$ or 0.6646 to 0.6647 and 1.638 to 1.639 (e) 18.9 or 18.91 to 18.93 (f) Correct ruled line (g) $0.665x + 13.6$ <i>their</i> $(0.665x + 1.64) + 12$ oe	2 1 1 1 2 1FT 2 1FT	$\pm \frac{1}{2}$ small square B1 for 3 or 4 correct Ignore comment on strength 2 B1 for either a or b correct or SC1 for $0.66x + 1.6$ 1FT FT <i>their</i> (d) 2 M1 for line through <i>their</i> mean point plotted or B1 for correct freehand line 1FT
6	(a) -0.4 oe (b) $(0, -4)$ (c) $2.5x - 2$ oe	1 1 3	 1 M1 FT for 2.5 or $-1/$ <i>their</i> (a) M1 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	M1 for Σfx used (at least 3 correct seen) soi by 240
	(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	i.e. correctly eliminating one variable from correct equations SC1 for -4.646 to -4.645 and 0.645 to 0.646 If 0 scored M1 for correct substitution into formula or correct sketch oe
	(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	B1 B1 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	B1 for $EDC = 90$
	(ii)	29	2	B1 for $ACD = 52$ or $90 - 38 - 23$ or $BDE = 29$ or M1 for $180 - (180 - 67) - 38$ oe
	(iii)	46	1	
	(b) (i)	4.25 or 4.253 to 4.254	2	M1 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	M3 for $\frac{56}{360} \times 2 \times \pi \times 8 +$ <i>their</i> $\frac{124}{360} \times 2 \times \pi \times$ <i>their</i> 4.25 oe or M1 for $\frac{56}{360} \times 2 \times \pi \times 8$ oe and M1 for <i>their</i> $\frac{124}{360} \times 2 \times \pi \times$ <i>their</i> 4.25 oe

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