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

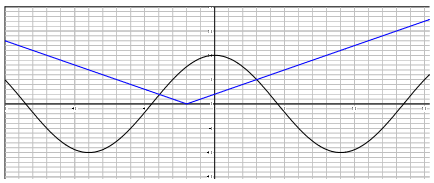
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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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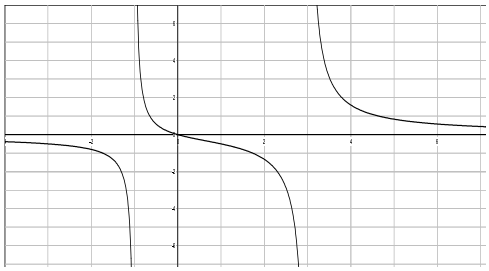
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1	**(a)**	8.5×10^6	**1**	
	(b)	5.1 million oe	**2**	**M1** for $8.5 [\times 10^6] \times 0.95^{10}$ oe soi by figs 509 or 5089…
	(c)	23.7 million oe (2.37×10^7)	**3**	**M2** for $8.5 [\times 10^6] \div 0.95^{20}$ oe soi by figs 237 or 2371… **M1** 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**	**M2** for (*their* 23.7 million – *their* 5.1 million) ÷ *their* 23.7 million × 100 or $(1 - 0.95^{30}) \times 100$ oe i.e. full method or **M1** for $1 - 0.95^{30}$ or (*their* 23.7 million – *their* 5.1 million) ÷ *their* 23.7 million or (*their* 5.1 million ÷ *their* 23.7 million) × 100
	(e)	2017	**3**	**M2** for $\frac{\log\left(\frac{3.5}{\text{their } 8.5}\right)}{\log 0.95}$ or $\frac{\log\left(\frac{3.5}{\text{their } 5.1}\right)}{\log 0.95}$ oe or appropriate sketch indicating solution 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 **SC2** 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**	**B1** for basic cosine shape **B1** for amplitude approx correct **B1** 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**	**SC1** 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**	**B1** for *x* or *y* movement correct.
	(b)	Rotation 90 clockwise oe (1, 7)	**5**	**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	**4**	**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)
	(b)	232 or 231.8 to 232.1	**1FT**	**FT** *their* **(a)** × 8.4
	(c)	9.2[0] or 9.197…	**3**	**M2** for *their* $(2.5 + 3.5 + 1.3) \times \sqrt[3]{2}$ oe or **M1** for s.f. = $\sqrt[3]{2}$ oe (1.25992…)
5	**(a)**	5 Points plotted	**2**	$\pm \frac{1}{2}$ small square **B1** 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* =] 0.665*x* + 1.64 or 0.6646 to 0.6647 and 1.638 to 1.639	**2**	**B1** for either *a* or *b* correct or **SC1** for 0.66*x* + 1.6
	(e)	18.9 or 18.91 to 18.93	**1FT**	**FT** *their* **(d)**
	(f)	Correct ruled line	**2**	**M1** for line through *their* mean point plotted or **B1** for correct freehand line
	(g)	0.665*x* + 13.6 *their* (0.665*x* + 1.64) + 12 oe	**1FT**	
6	**(a)**	– 0.4 oe	**1**	
	(b)	(0, – 4)	**1**	
	(c)	2.5*x* – 2 oe	**3**	**M1 FT** for 2.5 or –1/ *their* **(a)** **M1** for substituting (2, 3) into *their* $y = 2.5x + c$ 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 **In parts (c), (d), (e) do not penalise incorrect cancelling or converting.** **No ratios or words are accepted.** **If decimal forms, usual 3 sig fig rule applies.**
	(c)	$\frac{13}{40}$	**1FT**	**FT** $\frac{their\ 13}{40}$
	(d)	$\frac{11}{130}$ oe	**3**	**M2** for $\frac{their\ 12}{40} \times \frac{their\ 11}{39}$ or **M1** for $\frac{x}{40} \times \frac{x-1}{39}$
	(e)	$\frac{13}{50}$ oe	**3**	**M2** for $\frac{their\ 13}{their\ 25} \times \frac{their\ 12}{their\ 24}$ or **M1** for $\frac{x}{their\ 25} \times \frac{x-1}{their\ 24}$
8	**(a)**		**3**	**B1** for each branch **SC2** for correct but branches joined
	(b)	$x = -1$ $x = 3$ $y = 0$	**1** **1** **1**	
	(c)	$x < -1$ $-0.886[0\ldots] < x < 3$ $x > 3.39$ or $3.386\ldots)$	**1** **1** **1**	Condone $\leqslant$ 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**	
	(ii)	5	**1**	
	(iii)	3	**1**	
	(iv)	3.04 or 3.037 to 3.038	**2**	**M1** for Σfx used (at least 3 correct seen) soi by 240
	(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	**1**	
		$-6 = (-3)^2 - 3b + c$ oe	**1**	
	(b)	Simplified to $b + c = 1$ and $-3b + c = -15$ oe	**B1**	
		Subtraction or $1 - b = -15 + 3b$ oe	**B1**	i.e. correctly eliminating one variable from correct equations
		Completion to $b = 4$ and $c = -3$ with no errors	**1**	
	(c) (i)	-4.65	**1**	**SC1** for -4.646 to -4.645 **and** 0.645 to 0.646
		0.65	**1**	If 0 scored **M1** for correct substitution into formula or correct sketch oe
	(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 $\frac{56}{360} \times 2 \times \pi \times 8 +$ *their* $\frac{124}{360} \times 2 \times \pi \times$ *their* 4.25 oe or **M1** for $\frac{56}{360} \times 2 \times \pi \times 8$ oe and **M1** for *their* $\frac{124}{360} \times 2 \times \pi \times$ *their* 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...) or **M1** for $19.5^2 = 12.6^2 + 13.8^2 - 2 \times 12.6 \times 13.8 \cos\theta$
	(c)	$\frac{1}{2} \times 10.1 \times$ *their* 7.53 + $\frac{1}{2} \times 12.6 \times 13.8 \times \sin$ *their* 95.1 oe	**M3**	**M1** for $\frac{1}{2} \times 10.1 \times$ *their* 7.53 and **M1** for $\frac{1}{2} \times 12.6 \times 13.8 \times \sin$ *their* 95.1 oe
		125 or 124.5 to 124.7	**B1**	
13	**(a)**	$\frac{x-4}{60}$ oe	**1**	
	(b) **(i)**	$\frac{70x}{60} + \frac{15(x-4)}{60} = 33$ oe	**M1**	
		$70x + 15(x - 4) = 60 \times 33$ oe or $\frac{85x - 60}{60} = 33$	**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 $33 \div (20 +$ *their* 24$) \times 60$

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