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.

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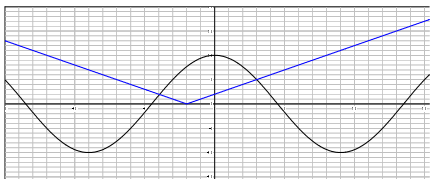
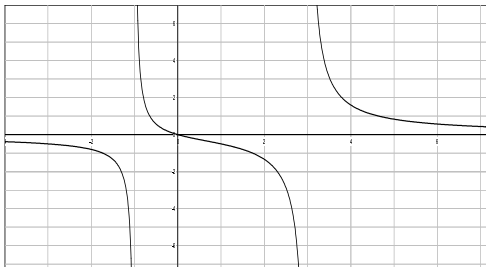
CAMBRIDGE
International Examinations

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

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 =] 0.665x + 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 0.66x + 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)	0.665x + 13.6 *their* (0.665x + 1.64) + 12 oe	1FT	
6	(a)	– 0.4 oe	1	
	(b)	(0, – 4)	1	
	(c)	2.5x – 2 oe	3	**M1 FT** for 2.5 or –1/ *their* **(a)** **M1** for substituting (2, 3) into *their* $y = 2.5x + c$ or $y – 3 = m(x – 2)$

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 $\frac{2(x+1)}{(x-2)(x+2)}$

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

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$) \times 60$