CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 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.

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1	(a)	$600 \div 5 \times 4$ oe	M1	
	(b)	537.60	4	**B1** for [principal] $=480$ soi and **M2** for $their\ 480 + \dfrac{their\ 480 \times 4 \times 3}{100}$ oe or **M1** for $\dfrac{their\ 480 \times 4 \times 3}{100}$ oe
	(c) (i)	532.18	3	**M2** for $480 \times (1.035)^3$ oe or **M1** for $480 \times (1.035)^k$ oe $k \geqslant 2$
	(ii)	21	3	**M2** for $\dfrac{\log 2}{\log 1.035}$ oe or or other appropriate graph which can clearly lead to answer or **M1** for $480(1.035)^n = 960$ oe
2	(a)	0.3675	1	
	(b)	[0]5 37	1	
	(c)	87.3 or 87.27…	2	**M1** for $1200 \div$ time in hours $(13 <$ time $< 14)$ oe
	(d)	2.55 or 2.545…	4	**B1** for 21 min or 0.35 h and **M2** for $\dfrac{their\ 0.35}{13.75} \times 100$ oe or **M1** for $\dfrac{\text{any time difference}}{13.75 \text{ or } 13.45} \times 100$ oe
	(e)	420	3	**M2** for $441 \div 1.05$ oe or **M1** for recognising 441 as 105%

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3	(a)	(i)	10	1	
		(ii)	28	1	
		(iii)	20	1	
	(b)	(i)	$\dfrac{18}{30}$ oe	1	
		(ii)	$\dfrac{19}{30}$	1	
	(c)		$\dfrac{42}{272}$ oe	3	**M2** for $\dfrac{7}{17} \times \dfrac{6}{16}$ or **M1** for product of fractions over 17 and 16
4	(a) (f) (i) (g) (i)		 Fully correct graph drawn	2	**B1** for reasonable shaped and separate branches but lacking reasonable accuracy
	(b)	(i)	(0, 0)	1	
		(ii)	(4, 8)	1	
	(c)		$[f(x)] \leqslant 0,\ [f(x)] \geqslant 8$ o.e.	2	**B1 B1**
	(d)		1 or 2 or 3 or 4 or 5 or 6 or 7	1	
	(e)		$x = 2$	1	
	(f)	(i)	Correct line drawn, positive gradient and approximately asymptotic	1	
		(ii)	Asymptote	1	
	(g)	(i)	Correct curve drawn	2	**B1** for reasonable shape but lacking reasonable accuracy
		(ii)	$2 < x$ $x < 2.48$ or 2.484 to 2.485 oe	2	**B1** **B1**

5	(a)		68	3	**B1** for [ABC] = 44 or [XCB] = 136 **B1** for [BAC or ACB] = 68 or [ACD] = 112
	(b)		36	4	**B2** for x = 10 or **M1** for $15x + 20 + x = 180$ oe and **M1 FT** for $360 \div$ *their x* **only** if answer is integer
	(c)	(i)	30	1	
		(ii)	70	1	
		(iii)	100	1	
6	(a)	(i)	18.1	2	**M1** if at least 2 mid-values soi
		(ii)	Correct histogram drawn	3	**B1** for correct widths no gaps **B2** for 4 correct heights or **B1** for 3 correct heights drawn
	(b)	(i)	22	1	
		(ii)	12	2	**B1** for [LQ] = 15 or [UQ] = 27
		(iii)	10	2	**B1** for 90 seen

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7	(a)	Correct reduction method to eliminate one variable or correct sketch $x = -2$ $y = 3$	M1 B1 B1	SC1 for correct answers without working
	(b)	$\dfrac{13 - 21k}{11}$ oe	4	B1 for common denominator of 21 oe B2 for $3(x + 2) - 7(2x - 1)$ or better or B1 for $3(x + 2)$ or $7(2x - 1)$
	(c) (i)	$\dfrac{120}{x}$	1	
	(ii)	$\dfrac{90}{x + 0.4}$	1	
	(iii)	0.8[0] oe	4	M1 for *their* (c)(i) + *their* (c)(ii) = 225 A2 for sketch of $y = \dfrac{12}{x} + \dfrac{90}{x + 4}$ and $y = 225$ or other sketch which could lead to correct answer or A1 for $120(x + 0.4) + 90x = 225x(x + 0.4)$ or better e.g. $225x^2 - 120x - 48 = 0$ and A1 for $(5x - 4)(45x + 12)$ or A2 for $\dfrac{--120 \pm \sqrt{(-120)^2 - 4(225)(-48)}}{2(225)}$ oe

8	(a)	$240^2 + 200^2 - 2 \times 240 \times 200 \cos 33$	M1	
		131 or 130.7 …	B2	No further wrong working allowed **B1** for $[BV^2 =]$ 17080 to 17090
	(b)	$\dfrac{\sin 77}{200} = \dfrac{\sin 68}{GB}$ oe	M1	
		190 or 190.3 …	B2	If **B0** then **A1** for $\dfrac{200 \sin 68}{\sin 77}$
	(c)	240 or 239.6 to 239.9	5	**B1** for angle $MBG = 35°$ soi **M1** for correct use of scale and conversion **M2FT** for $\dfrac{1}{2} \times 24 \times 20 \sin 33 + \dfrac{1}{2} \times 20 \times$ $\dfrac{their(b)}{10} \sin(180 - 68 - 77)$ or **M1** for one of the triangles **SC3** for figs 239.6 to 239.9... or 240
	(d) (i)	186	1	
	(ii)	265	1	
9	(a)	14 h 21 or 22 min	5	**M2** for $\pi \times 80^2 \times 90 \div 35$ or **M1** for $\pi \times 80^2 \times 90$ **M1 FT** for $\div 60 \div 60$ **M1 FT** for decimal part of hours into min
	(b)	440 000	4FT	**FT** $2\,250\,000 - their$ volume in **(a)** if seen **B3** for 440 000 to 441 000 or **M2** for $150 \times 150 \times 100 - their$ volume in **(a)** if seen or **M1** for $150 \times 150 \times 100$ If **B0** scored then **B1 FT** for rounding to 2 sf (if answer allows)
	(c)	4.4×10^5	1FT	**FT** their **(b)**

10	(a)	(i)	$\mathbf{r} + \mathbf{t}$	1	
		(ii)	$\dfrac{1}{3}\mathbf{r} - \dfrac{1}{3}\mathbf{t}$ oe	2	**M1** for a correct route.
	(b)	(i)	$\dfrac{1}{3}\mathbf{r}$	1	
		(ii)	On *AB* [extended] oe **dependent on part (b)(i)** being *k***r**	1dep	
11	(a)		11	2	**B1** for [f(2) =] 5
	(b)	(i)	Curve translated one to left	2	**B1** for any other translation parallel to *x*-axis
		(ii)	Translation	1	Marks independent
			$\begin{pmatrix} -1 \\ 0 \end{pmatrix}$	1	
	(c)	(i)	$\sqrt[3]{x}$ or $x^{\frac{1}{3}}$	1	
		(ii) (a)	Correct curve	1	
		(b)	Reflection $y = x$	1 1	
12	(a)		2.4	3	**M2** for $\left(\dfrac{h}{4}\right)^3 = \dfrac{108}{500}$ oe or better or **M1** for cube or cube root soi
	(b)		250	2	**M1** for $\dfrac{A}{90} = \left(\dfrac{4}{\textit{their}(\mathbf{a})}\right)^2$ oe or better or $\dfrac{A}{90} = \left(\sqrt[3]{\dfrac{500}{108}}\right)^2$ oe