CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 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 Exa Report for Teachers.

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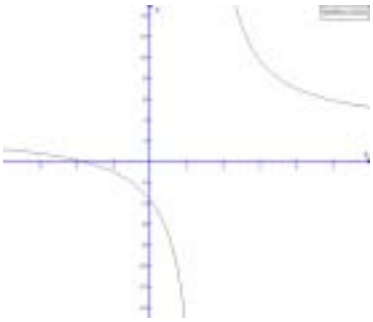
Abbreviations

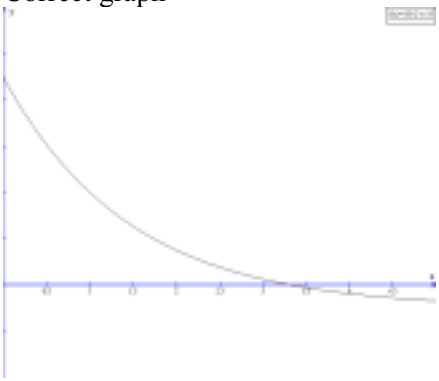
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
nfww not from wrong working
soi seen or implied

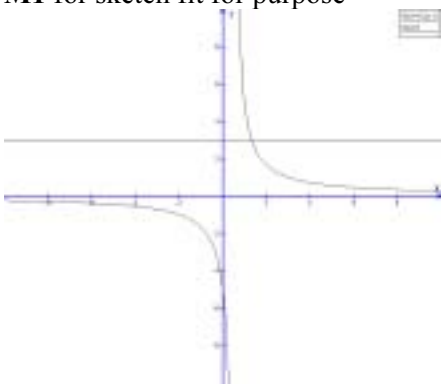
Question	Answer	Mark	Part Marks
1 (a)	10	**2**	**B1** for 3 correct terms of $\frac{\sqrt[3]{1000}}{5}+\frac{20+2^2}{\sqrt{9}}$ or **B1** for either of 2 or 8 soi
(b)	Numerator over-estimates, oe and denominator under-estimates oe	**2**	**B1** for each
(c)	8.55 or 8.546…	**1**	
2 (a) (i)	40.5 oe	**3**	**M1** for correct use of $a\log b$ **M1** for correct use of $\log a \pm \log b$
(ii)	210, 330 with no extras in range	**3**	**B2** for 210 or 330 ignoring any extras f or **M2** for appropriate sketch or **M1** for $\sin x = -0.5$ **A1** for 30 or – 30 soi
(b)	$[x =]\frac{1}{1-a^2}$ oe	**3**	**M1** Correct squaring **M1** Correct multiplication **M1** Collection of terms **M1** Correct factorisation and division by *their* $(1-a^2)$ **If answer incorrect, maximum possible is M2**
3 (a) (i)	57.2	**1**	
(ii)	56.8	**1**	
(b) (i)	$y = 25.9 + 0.54[0]x$ or 25.92 to 25.93, 0.5397…	**2**	**B1** for 25.9 + mx, or **B1** for c + 0.54x, If 0 scored, **SC1** for 26 + 0.5x or better
(ii)	53 or 53.4 to 53.5	**1FT**	**FT** *their* **(b)(i)**

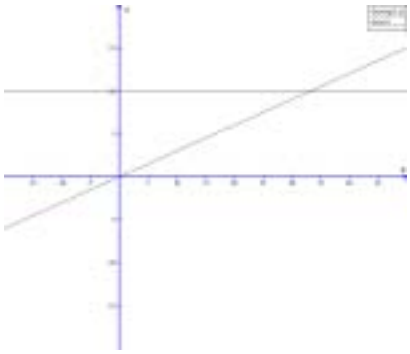
Question	Answer	Mark	Part Marks
4 (a) (i)	Reflection in x-axis	1	
(ii)	Rotation 90° [anticlockwise] [about] origin oe	2	**B1** for rotation
(b)	Reflection	1	
	$y = -x$	1	
5 (a)	-8	1	
	$34 - 7n$ oe	2	**M1** for $-7n + k$ or $34 + kn$ oe $k \neq 0$
(b)	32	1	
	$2048 \times \left(\frac{1}{2}\right)^n$ oe	2	**M1** for $\left(\frac{1}{2}\right)^{n+k}$ oe soi, where k is an integer
	e.g. $1024 \times \left(\frac{1}{2}\right)^{n-1}$ or 2^{11-n}		
6 (a)	49.3 or 49.33 to 49.34	2	**M1** for mid-points soi, at least 3 of (10, 25, 35, 45, 55, 70, 90) implied by 39470
(b)	146, 286, 446, 588, 700, 800	1	
(c)	Correct graph	3	**All marks in (c) and (d) are depende curve.** **B1** for plotting points at upper group li **B1FT** for correct vertical plots
(d) (i)	46 to 49	1	
(ii)	26 to 30	2	**B1** for 33 to 35, or 61 to 63 soi
(iii)	74 to 77	3	**M1** for 0.15×800 or 0.85×800 oe **M1** for **correct** use of *their* 680.

Question	Answer	Mark	Part Marks
7 (a) (i)	Correct graph 	2	**M1** for graph in 2 sections, with each section approximately correct.
(ii)	$x = 1.5$ oe	1	
	$y = 3$	1	
(iii)	(0, –3.67) or	1	
	(0, –3.667 to –3.666) or $\left(0, -\frac{11}{3}\right)$		
	(–1.83, 0) or (–1.833…, 0) or $\left(-\frac{11}{6}, 0\right)$	1	
(b)	$1.5 < x < 5.5$ oe	3	**B2** for $1.5 \leqslant x \leqslant 5.5$ oe or **B1** for 1.5 and 5.5 seen or for $x \leqslant$
	and		
	$x < -1$	1	Condone $\leqslant$ Ignore inclusion of –4 or 6 throughout
8 (a)	80	3	**B1** for 3h 45 min oe or better **M1** for $\frac{300}{\textit{their}\text{ time in hours}}$ oe
(b)	21 19 to 21 20	3	**M2** for $\frac{300}{1.05} \times \textit{their}(\mathbf{a})$ oe or **M1** for $1.05 \times$ *their*(**a**) oe or for $\frac{300}{\textit{their}\text{ new speed}}$ if > *their*(**a**)
(c)	107 or 107.4...	2	**M1** for $\frac{600}{8.1} \times 1.45$ or **SC1 for** $\frac{300}{8.1} \times 1.45 = 53.7$ *or* 53.70…

Question	Answer	Mark	Part Marks
9 (a)	99	**2**	**M1** for use of 1.1×0.9 oe
(b)	960	**2**	**M1** for use of 1.2×0.8 oe
(c)	$10000 - x^2$ oe	**3**	**M2** for use of $\left(1+\frac{x}{100}\right)\left(1-\frac{x}{100}\right)$ oe or **B1** for $\left(1\pm\frac{x}{100}\right)$ oe soi
10 (a) (i)	$\frac{6}{336}$ oe	**2**	**M1** for $\frac{3}{8}\times\frac{2}{7}\times\frac{1}{6}$
(ii)	$\frac{90}{336}$ oe	**3**	**M2** for $3\times\frac{3}{8}\times\frac{2}{7}\times\frac{5}{6}$ or **M1** for $\frac{3}{8}\times\frac{2}{7}\times\frac{5}{6}$ If **M0** scored, then **B1** for RRB, RBR, BRR
(iii)	$\frac{270}{336}$ $\frac{45}{56}$ oe	**3**	**M2** for $3\times\frac{3}{8}\times\frac{5}{7}\times\frac{4}{6}$ + *their* **(a)(ii)** or for 1 – *their* **(a)(i)** $-\frac{5}{8}\times\frac{4}{7}\times\frac{3}{6}$ or **M1** for $\frac{5}{8}\times\frac{4}{7}\times\frac{3}{6}+$ *their* **(a)(i)** or for
(b)	30	**2FT**	**M1** for $1680 \times$ *their* **(a)(i)**
11 (a)	Correctly eliminate 1 variable $x = 3$ $y = 2$	**M1** **B1** **B1**	or appropriate sketch If **B0** scored, **M1** for correct substitution to find 2nd variable.
(b)	(3.5, 5)	**2**	**B1** for each
(c)	$y = 6x - 16$ oe	**3**	**M1** for gradient $= \frac{3}{0.5}$ oe soi **M1** for substitution B or M into $y = mx + c$ oe
(d)	5	**2**	**M1** for $(k, k + 9)$ substituted into *their* **(c)** if linear

Question	Answer	Mark	Part Marks
12 (a)	30.4 or 30.41…	**3**	**M1** for $x^2 = 15^2 + 20^2 - 2\times15\times20\times\cos120$ **A1** for 925
(b)	$\sin B = \frac{20\sin120}{their30.4}$	**M2**	**M1** for $\frac{20}{\sin B} = \frac{their30.4}{\sin120}$ becomes **M2** if 34.71 to 34.73… seen
	34.71 to 34.73…	**A1**	
(c)	116 or 115.8….	**4**	**B1** for angle A = 34.7 or 34.71 to 34.73… or angle B = 55.3 or 55.26... to 55.29 **M1** for $AB = \frac{12}{\sin their34.7}\ (=21.1)$ oe **M1** for $AF = \frac{12}{\tan their34.7}\ (=17.3)$ oe
(d)	414 or 413.7 to 413.9	**3**	**M2** for $12\times15 + 0.5\times12\times their17.3 + 0.5\times15\times20\times\sin120$ oe or **M1** for any correct area.
13 (a) (i)	Correct graph 	**2**	**M1** for graph with correct shape.
(ii)	3.32 or 3.321 to 3.322	**1**	
(iii)	$[f(x)] > -10$	**1**	Ignore $\leqslant 90$
(b)	1.74 or 1.736 to 1.737	**1**	
(c)	Translate	**1**	
	$\begin{pmatrix}0\\-10\end{pmatrix}$	**1**	

Question	Answer	Mark	Part Marks
14 (a)	$\frac{x-3}{x}$	**1**	
(b)	$\frac{x}{x+3}$	**1FT**	
(c) (i)	All correct with no errors		
	$\frac{x}{x+3}-\frac{x-3}{x}=\frac{9}{40}$	**M1**	*their Q – their P*
	$\frac{x^2-(x-3)(x+3)}{x(x+3)}\left[=\frac{9}{40}\right]$ oe or better	**M1**	
	$360=9x^2+27x$ oe		
	$x^2+3x-40=0$	**A1**	i.e. at least one more correct line and no errors or omissions
(ii)	-8	**1**	
	5	**1**	
(iii)	$\frac{2}{5}$	**1**	Allow final answer $\frac{-11}{-8}$ but not $\frac{11}{8}$
15 (a)	$x < 0.5$ and $x > \frac{4}{3}$	**3**	**M1** for sketch fit for purpose  **B1** for $x > \frac{4}{3}$ or for $x < 0.5$ or for 0.5 and $\frac{4}{3}$ soi

Question	Answer	Mark	Part Marks
(b)	$x > 33.2$ or 33.21 to 33.22	**2**	**M1** for appropriate sketch  or **M1** for $x \log 2 > 10$