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

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 October/November 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

CAMBRIDGE
International Examinations

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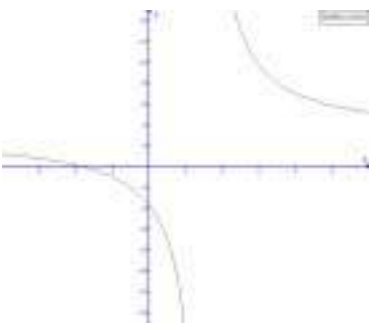
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part Marks
1 (a)	10	2	**B1** for 3 correct terms of $\dfrac{\sqrt[3]{1000}}{5}+\dfrac{20+2^2}{\sqrt{9}}$ 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 from using 30. or **M2** for appropriate sketch or **M1** for $\sin x = -0.5$ **A1** for 30 or -30 soi
(b)	$[x =]\dfrac{1}{1-a^2}$ oe	3	**M1** Correct squaring **M1** Correct multiplication **M1** Collection of terms **M1** Correct factorisation and division by *their* $\left(1-a^2\right)$ **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)**

© Cambridge International Examinations 2015
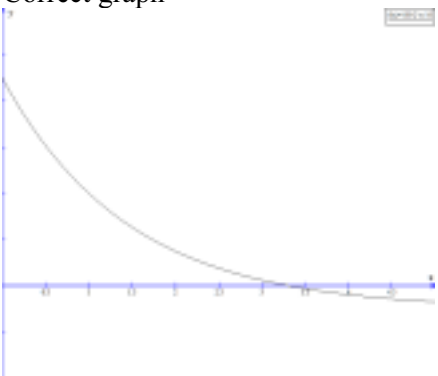
Question	Answer	Mark	Part Marks
4 **(a)** **(i)**	Reflection in *x*-axis	1	
(ii)	Rotation 90° [anticlockwise] [about] origin oe	2	**B1** for rotation
(b)	Reflection $y = -x$	1 1	
5 **(a)**	-8 $34 - 7n$ oe	1 2	**M1** for $-7n + k$ or $34 + kn$ oe $k \neq 0$
(b)	32	1	
	$2048 \times \left(\dfrac{1}{2}\right)^{n}$ oe e.g. $1024 \times \left(\dfrac{1}{2}\right)^{n-1}$ or 2^{11-n}	2	**M1** for $\left(\dfrac{1}{2}\right)^{n+k}$ oe soi, where *k* is an integer
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 39 470
(b)	146, 286, 446, 588, 700, 800	1	
(c)	Correct graph	3	**All marks in (c) and (d) are dependent on increasing curve.** **B1** for plotting points at upper group limit **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.
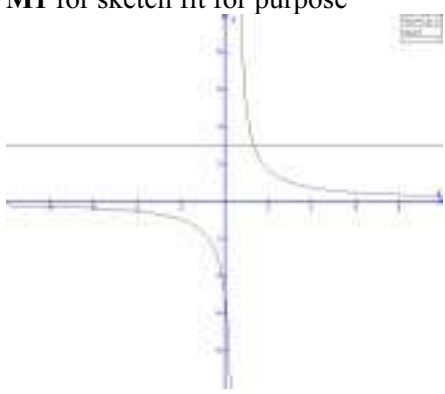
© Cambridge International Examinations 2015

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 $y = 3$	1 1	
(iii)	$(0, -3.67)$ or $(0, -3.667$ to $-3.666)$ or $\left(0, -\dfrac{11}{3}\right)$ $(-1.83, 0)$ or $(-1.833\ldots, 0)$ or $\left(-\dfrac{11}{6}, 0\right)$	1 1	
(b)	$1.5 < x < 5.5$ oe and $x < -1$	3 1	**B2** for $1.5 \leqslant x \leqslant 5.5$ oe or **B1** for 1.5 and 5.5 seen or for $x \leqslant 5.5$ or $1.5 \leqslant x$ Condone $\leqslant$ Ignore inclusion of –4 or 6 throughout
8 (a)	80	3	**B1** for 3h 45 min oe or better **M1** for $\dfrac{300}{\textit{their} \text{ time in hours}}$ oe
(b)	21 19 to 21 20	3	**M2** for $\dfrac{300}{1.05} \times \textit{their}\,(\mathbf{a})$ oe or **M1** for $1.05 \times \textit{their}(\mathbf{a})$ oe or for $\dfrac{300}{\textit{their} \text{ new speed}}$ if $> \textit{their}(\mathbf{a})$
(c)	107 or 107.4...	2	**M1** for $\dfrac{600}{8.1} \times 1.45$ or **SC1 for** $\dfrac{300}{8.1} \times 1.45 = 53.7$ *or* $53.70\ldots$
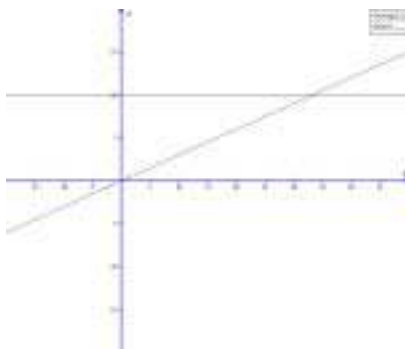
© Cambridge International Examinations 2015

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 $\left(1 + \dfrac{x}{100}\right)\left(1 - \dfrac{x}{100}\right)$ oe or **B1** for $\left(1 \pm \dfrac{x}{100}\right)$ oe soi
10 **(a)** **(i)**	$\dfrac{6}{336}$ oe	**2**	**M1** for $\dfrac{3}{8} \times \dfrac{2}{7} \times \dfrac{1}{6}$
(ii)	$\dfrac{90}{336}$ oe	**3**	**M2** for $3 \times \dfrac{3}{8} \times \dfrac{2}{7} \times \dfrac{5}{6}$ or **M1** for $\dfrac{3}{8} \times \dfrac{2}{7} \times \dfrac{5}{6}$ If **M0** scored, then **B1** for RRB, RBR, BRR
(iii)	$\dfrac{270}{336}$ $\dfrac{45}{56}$ oe	**3**	**M2** for $3 \times \dfrac{3}{8} \times \dfrac{5}{7} \times \dfrac{4}{6}$ + *their* **(a)(ii)** or for $1 - their$ **(a)(i)** $- \dfrac{5}{8} \times \dfrac{4}{7} \times \dfrac{3}{6}$ or **M1** for $\dfrac{5}{8} \times \dfrac{4}{7} \times \dfrac{3}{6} + their$**(a)(i)** or for $\dfrac{3}{8} \times \dfrac{5}{7} \times \dfrac{4}{6} + \dfrac{3}{8} \times \dfrac{2}{7} \times \dfrac{5}{6}$
(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 $= \dfrac{3}{0.5}$ 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

© Cambridge International Examinations 2015

Question	Answer	Mark	Part Marks
12 **(a)**	30.4 or 30.41…	3	**M1** for $x^2 = 15^2 + 20^2 - 2 \times 15 \times 20 \times \cos120$ **A1** for 925
(b)	$\sin B = \dfrac{20\sin120}{their\,30.4}$ 34.71 to 34.73…	**M2** **A1**	**M1** for $\dfrac{20}{\sin B} = \dfrac{their\,30.4}{\sin120}$ becomes **M2** if 34.71 to 34.73… seen
(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 $AB = \dfrac{12}{\sin their\,34.7} (= 21.1)$ oe **M1** for $AF = \dfrac{12}{\tan their\,34.7} (= 17.3)$ oe
(d)	414 or 413.7 to 413.9	3	**M2** for $12 \times 15 + 0.5 \times 12 \times their\,17.3 + 0.5 \times 15 \times 20 \times \sin120$ 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 $\begin{pmatrix} 0 \\ -10 \end{pmatrix}$	1 1	

Question	Answer	Mark	Part Marks
14 (a)	$\dfrac{x-3}{x}$	1	
(b)	$\dfrac{x}{x+3}$	1FT	
(c) (i)	All correct with no errors $$\dfrac{x}{x+3} - \dfrac{x-3}{x} = \dfrac{9}{40}$$	M1	*their Q – their P*
	$$\dfrac{x^2 - (x-3)(x+3)}{x(x+3)}\left[=\dfrac{9}{40}\right] \text{ oe or}$$ 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)	$\dfrac{2}{5}$	1	Allow final answer $\dfrac{-11}{-8}$ but not $\dfrac{11}{8}$
15 (a)	$x < 0.5$ and $x > \dfrac{4}{3}$	3	**M1** for sketch fit for purpose **B1** for $x > \dfrac{4}{3}$ or for $x < 0.5$ or for 0.5 and $\dfrac{4}{3}$ soi

© Cambridge International Examinations 2015

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