

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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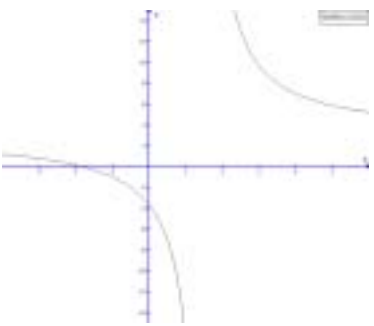
Abbreviations

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

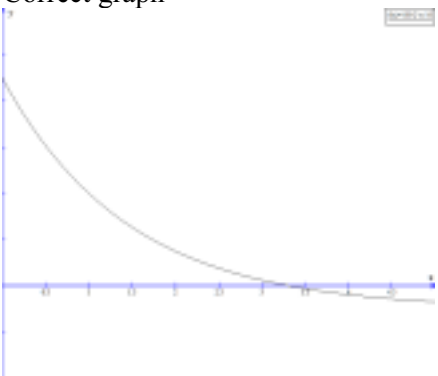
Question	Answer	Mark	Part Marks
1 (a)	10	2	B1 for 3 correct terms of $\frac{\sqrt[3]{1000}}{5} + \frac{20+2^2}{\sqrt{9}}$ or B1 for either of 2 or 8 soi
	(b) Numerator over-estimates, oe and denominator under-estimates oe	2	B1 for each
	(c) 8.55 or 8.546...	1	
2 (a)	(i) 40.5 oe	3	M1 for correct use of $a \log b$ 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 from using 30. 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 <i>their</i> $(1-a^2)$ 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 <i>their</i> (b)(i)

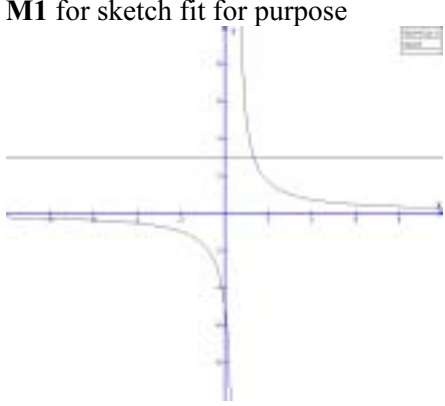
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Question	Answer	Mark	Part Marks	
4	(a) (i) Reflection in x -axis	1	B1 for rotation	
	(ii) Rotation 90° [anticlockwise] [about] origin oe	2		
	(b) Reflection $y = -x$	1 1		
5	(a) -8 $34 - 7n$ oe	1 2	M1 for $-7n + k$ or $34 + kn$ oe $k \neq 0$	
	(b) 32	1		
	$2048 \times \left(\frac{1}{2}\right)^n$ oe e.g. $1024 \times \left(\frac{1}{2}\right)^{n-1}$ or 2^{11-n}	2		M1 for $\left(\frac{1}{2}\right)^{n+k}$ 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 39470 All marks in (c) and (d) are dependent on increasing curve. B1 for plotting points at upper group limit BIFT for correct vertical plots	
	(b) 146, 286, 446, 588, 700, 800	1		
	(c) Correct graph	3		
	(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 <i>their</i> 680.

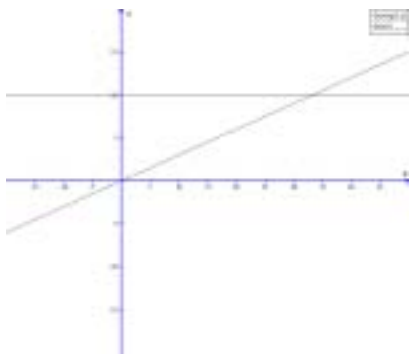
Question	Answer	Mark	Part Marks
7 (a) (i)	Correct graph 	2	M1 for graph in 2 sections, with each section approximately correct.
(ii)	$x = 1.5$ oe $y = 3$	1 1	
(iii)	$(0, -3.67)$ or $(0, -3.667 \text{ to } -3.666)$ or $\left(0, -\frac{11}{3}\right)$	1	
	$(-1.83, 0)$ or $(-1.833\dots, 0)$ or $\left(-\frac{11}{6}, 0\right)$	1	
(b)	$1.5 < x < 5.5$ oe and $x < -1$	3 1	B2 for $1.5 \leq x \leq 5.5$ oe or B1 for 1.5 and 5.5 seen or for $x \leq 5.5$ or $1.5 \leq x$ Condone \leq Ignore inclusion of -4 or 6 throughout
8 (a)	80	3	B1 for 3h 45 min oe or better M1 for $\frac{300}{\text{their time in hours}}$ oe
(b)	2119 to 2120	3	M2 for $\frac{300}{1.05} \times \text{their(a)}$ oe or M1 for $1.05 \times \text{their(a)}$ oe or for $\frac{300}{\text{their new speed}}$ if $> \text{their(a)}$
(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 $3 \times \frac{3}{8} \times \frac{5}{7} \times \frac{4}{6} + \text{their (a)(ii)}$ or for $1 - \text{their (a)(i)} - \frac{5}{8} \times \frac{4}{7} \times \frac{3}{6}$ or M1 for $\frac{5}{8} \times \frac{4}{7} \times \frac{3}{6} + \text{their (a)(i)}$ or for $\frac{3}{8} \times \frac{5}{7} \times \frac{4}{6} + \frac{3}{8} \times \frac{2}{7} \times \frac{5}{6}$
(b)	30	2FT	M1 for $1680 \times \text{their (a)(i)}$
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 2 nd 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 $x^2 = 15^2 + 20^2 - 2 \times 15 \times 20 \times \cos 120$ A1 for 925
(b)	$\sin B = \frac{20 \sin 120}{\text{their} 30.4}$ 34.71 to 34.73...	M2 A1	M1 for $\frac{20}{\sin B} = \frac{\text{their} 30.4}{\sin 120}$ 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 $AB = \frac{12}{\sin \text{their} 34.7}$ (= 21.1) oe M1 for $AF = \frac{12}{\tan \text{their} 34.7}$ (= 17.3) oe
(d)	414 or 413.7 to 413.9	3	M2 for $12 \times 15 + 0.5 \times 12 \times \text{their} 17.3 + 0.5 \times 15 \times 20 \times \sin 120$ 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 ≤ 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)	$\frac{x-3}{x}$	1	
(b)	$\frac{x}{x+3}$	1FT	
(c) (i)	All correct with no errors $\frac{x}{x+3} - \frac{x-3}{x} = \frac{9}{40}$ $\frac{x^2 - (x-3)(x+3)}{x(x+3)} \left[= \frac{9}{40} \right]$ oe or better $360 = 9x^2 + 27x$ oe $x^2 + 3x - 40 = 0$	M1 M1	<i>their Q – their P</i>
(ii)	-8	1	i.e. at least one more correct line and no errors or omissions
	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

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