



CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/61

Paper 6 (Extended)

May/June 2016

MARK SCHEME

Maximum Mark: 40

Published

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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
 nfwf not from wrong working
 soi seen or implied

A INVESTIGATION		MOVING TRIANGLES														
Question	Answer	Mark	Part Marks													
1 (a)	2	1	B1 for each one correct													
(b)	<table border="1"> <thead> <tr> <th>Scale factor</th> <th><i>PS</i></th> <th><i>PB</i></th> </tr> </thead> <tbody> <tr> <td>3</td> <td>4</td> <td>12</td> </tr> <tr> <td>5</td> <td>6</td> <td>30</td> </tr> <tr> <td>7</td> <td>2</td> <td>14</td> </tr> </tbody> </table>	Scale factor			<i>PS</i>	<i>PB</i>	3	4	12	5	6	30	7	2	14	3
Scale factor	<i>PS</i>	<i>PB</i>														
3	4	12														
5	6	30														
7	2	14														
(c)	Similar	1														
2 (a)	$\frac{2}{20} = \frac{1}{10}$ oe	1	Allow, for example, $2 : 20 = 1 : 10$ or $2 : 1 = 20 : 10$ or $2 \times 10 = 20$ and $1 \times 10 = 10$ or $2 : 20$ and $1 : x$ so $2x = 20, x = 10$ or PS is double RS so PB is double QB or equivalent													
(b)	8	1	C opportunity													
(c)	$\frac{y}{2}$ oe	1	condone $\frac{y}{2} \times 1$													
3	$\frac{y}{4}$ oe	1	condone $\frac{y}{4} \times 1$ If 0 scored in 2(c) and 3, allow SC1 for answers of $y = 2x$ and $y = 4x$													

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Question	Answer	Mark	Part Marks
4 (a)	18	1	C opportunity
(b)	12	1	C opportunity
(c)	<i>their 6</i>	1FT	strict FT <i>their y – their z</i>
5	[y =] 5x and [z =] 4x [AP =] 5x – 4x = x	M1 A1	may be on diagram Allow 2 marks for y = 5x and z = 4x seen or clearly indicated [AP =] y – z = x
6	[AP =] nx – (n – 1)x = x	1	or nx – (nx – x) = x or nx – nx + x = x not from wrong working or equating expressions for BQ $\frac{y}{n} = \frac{z}{n-1}$ and rearranging to show that either $y - z = \frac{y}{n}$ with $x = \frac{y}{n}$ or that $y - z = \frac{z}{n-1}$ with $x = \frac{z}{n-1}$ C opportunity
7 (a)	$\frac{x}{2}$	2	M1 for $\frac{1}{2}xn$ and $\frac{1}{2}x(n-1)$ oe seen or for $x = 2AP$
(b)	$\frac{x}{m}$	1	C opportunity
Communication seen in 3 of 2(b), 4(a), 4(b), 6 or 7(b)		2	C1 if seen in two of them

B MODELLING		MUSICAL NOTES	
Question	Answer	Mark	Part Marks
1	<p>Correct curve over full domain.</p>	2	<p>B1 for at least one correct, complete cycle e.g. over the domain $0 \leq t \leq \frac{1}{110}$</p> <p>or for a graph of incorrect shape but that has 4 cycles over the full domain</p> <p>or for a graph with more than 3 inaccurate t-intercepts with 4 cycles over the full domain</p> <p>or for a fully correct and accurate sketch graph of the sine wave for the note A_0</p>
2	<p>(a) (i) 32.7[0] or 32.703 to 32.7032 isw</p> <p>(ii) C_1</p> <p>(iii) 41.2[0] or 41.203 to 41.2035 isw</p> <p>(b) [0, 12,] 24, 36, 48, 60, 72, 84</p> <p>(c) C_7 and 4190 or 4186 or 4186.0 or 4186.00 or 4186.009 to 4186.01</p>	1 1 1 1 1	C opportunity
3	$2^{\frac{1}{12}}$ or exact equivalent	1	isw conversion to decimal, but decimal answer only does not score C opportunity
4	<p>(a) Correct exponential shape</p> <p>(b) F_5</p>	1 2	<p>Intent of smooth curve; must not cross x-axis; condone graph not drawn on full domain; condone y-intercept at origin;</p> <p>M1 for $n = 68$ soi e.g. $f(68)$ or $27.5 \times 2^{\frac{68}{12}}$</p> <p>C opportunity</p>

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Question	Answer	Mark	Part Marks
5 (a)	600	1	
(b)	$\frac{1}{10}$ oe isw	1	
(c)	Uses an algebraic process to find either $h(n+1) = 2^{\text{their } \frac{1}{10}} \times h(n)$ oe or $k = 2^{\text{their } \frac{1}{10}}$ or 1.07 or 1.071 to 1.072	1FT	FT <i>their</i> value of b , provided $b \neq 1$; Allow $k = 2^b$ isw Condone k found by calculating the ratio of at least 2 pairs of consecutive values e.g. $\frac{h(2)}{h(1)}$ and $\frac{h(4)}{h(3)}$
6 (a)	77.3 or 77.29 to 77.295	2	M1 for $2^{\frac{k}{23}}$ where k may be a constant or a variable seen C opportunity
(b)	9	2	not from wrong working M1 for $100 \times 2^n = 108$ or $100 \times 1.08^n = 200$ or $1.08^n = 2$ or for $1.08^9 = 1.99\dots$ soi or for two correct trials using a valid relationship seen C opportunity
Communication in 2 of 2(a)(iii), 3, 4(b), 6(a) or 6(b)		2	C1 if seen in 1 of them