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CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/61**

Paper 6 (Extended) **May/June 2016**

MARK SCHEME

Maximum Mark: 40

Published

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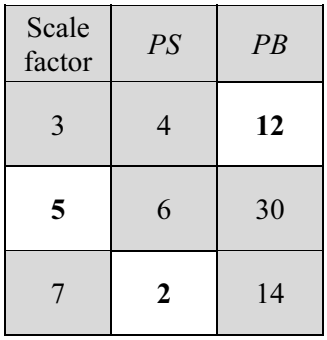
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Abbreviations
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
nfww not from wrong working
soi seen or implied

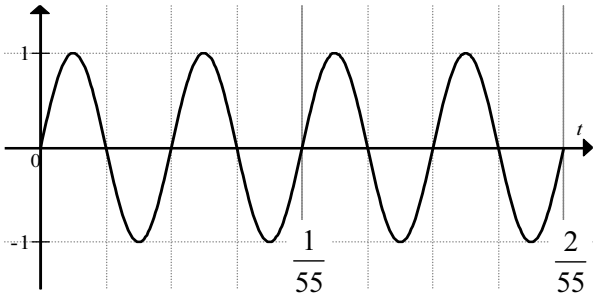
A INVESTIGATION MOVING TRIANGLES

Question	Answer	Mark	Part Marks
1 (a)	2	**1**	
(b)		**3**	**B1** for each one correct
(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 × 10 = 20 and 1 × 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)	*their* 6	**1FT**	**strict FT** *their y – their z*
5	$[y =]\ 5x$ and $[z =]\ 4x$	**M1**	may be on diagram
	$[AP =]\ 5x - 4x = x$	**A1**	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

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

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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 $h(n+1) = 2^{their\frac{1}{10}} \times h(n)$ oe or $k = 2^{their\frac{1}{10}}$ or 1.07 or 1.071 to 1.072	**1FT**	**FT** *their* 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 $1.08^9 = 1.99\ldots$ 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

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