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CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/62**

Paper 6 (Extended) **October/November 2017**

MARK SCHEME

Maximum Mark: 40

Published

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MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method marks, awarded for a valid method applied to the problem.

A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation '**dep**' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

Abbreviations

awrt	answers which round to
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
nfww	not from wrong working
oe	or equivalent
rot	rounded or truncated
SC	Special Case
soi	seen or implied

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Question	Answer	Marks	Partial Marks
A	**INVESTIGATION NUMBER WALLS**		
1(a)	9 4 5	**1**	
1(b)	3 is added two times oe or 3 [and not 2] is added to 1 oe	**1**	
2(a)	20 8 12 3 5 7	**1**	
2(b)	A correct *Number wall* with total **>** *their* 20	**1**	
2(c)	□ 14 17 □ □ 7 –3 □ 3 □	**1**	
3(a)	$a + 3b + 3c + d$ $a + 2b + c$ $b + 2c + d$ $b + c$ $c + d$	**1**	
3(b)	*their* $(a + 3b + 3c + d) = 34$ oe and 4.25 oe or is not an integer	**1**	**C** opportunity
3(c)	3 5 1 2 6 and 4 4 2 1 7	**2**	**B1** for each Numbers may be in reverse order **C** opportunity
4(a)	Row 3 gives the coefficients of *a*, *b*, *c* and *d*	**1**	
4(b)	[1]$a + 4b + 6c + 4d$ + [1]e oe	**1**	
4(c)	[1 ×]3 + 4 × 5 + 6[× 1] + 4×2 + [1 ×]6 = [43] or [1 ×]4 + 4 × 4 + 6 × 2 + 4[× 1] + [1 ×]7 = [43]	**1**	Pairs of multiplications may be in any order
5(a)	$4a$ $8a$ $2^{(h-1)}a$ oe	**1**	
5(b)	3	**1**	**C** opportunity
5(c)	23	**2**	**M1** for *their* $2^{(h-1)}a = 20\,971\,520$ soi or **B1** for 22 **C** opportunity

Question	Answer	Marks	Partial Marks
6	3 and 5 only	**3**	Ignore answer of 1 **B1** for 3 or 5 only **B1** for x, $x + 1$, $x + 2$, [...] Allow other letters for x **C** opportunity
Communication: seen in three of the following questions		**1**	
3(b)	*their* $8a = 34$ or $34 \div 8$ or a correct trial for $a = 4.25$		
3(c)	Completing all empty bricks with 23, 20, 11, 8, 3, 8 or working with equations		
5(b)	$2^{6-1}a = 96$ or better or *their* expression, with $h = 6$, $= 96$ or $32a = 96$ or $96 \div 32$ or wall, height 6, 96 at top, 3 in bottom cells		
5(c)	$(h-1)\log 2 = \log(20\,971\,520 \div 5)$ oe or $h - 1 = \log_2 4194304$ oe or T & I using h with more than one trial		
6	Construction of wall with consecutive numbers in bottom row with total 70 to 90 or use x, $x + 1$, [$x + 2$, …] to set up one correct equation = 80		

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Question	Answer	Marks	Partial Marks
B	**MODELLING RANGES**		
1(a)	Correct curve	**3**	Polygon scores 0 **B2** for 9 or 10 points correctly plotted or **B1** for 7 or 8 points correctly plotted
1(b)	25 to 27 and 63 to 65	**1**	
1(c)	45	**1**	
1(d)	[r =] 10.2 [sin2x]	**2**	**B2** for 10.15 to 10.3 or **B1** for 10 only seen or **M1** for correct substitution of x and r (x and $r \neq 0$) into model **C** opportunity
1(e)	–3.52… to –3.42… The shot lands behind him oe	**2**	**B1** for each **B1FT** if value negative Accept backwards for behind
2(a)	It would land on him oe or it would have range 0 oe	**1**	Ignore extra comments that are not contradictory
2(b)	Correct curve	**2**	**B1** for 6, 7 or 8 points correctly plotted Ignore curve for $0 \leqslant x < 10$ and $80 < x \leqslant 90$
2(c)	The ranges are close oe	**1**	
3(a)	n shaped curve	**1**	From (0, 0) to above 80 **C** opportunity
3(b)	n shaped curve and Correct interpretation of two sketches	**2**	If sketch in part **(a)** correct then curve should be below sketch **B1** for curve from $x = 10$ to $x = 80$ always above x-axis **B1FT** e.g. (for correct sketches), not good for angles from approx. 30 to 60 oe or good at low and high angles oe or the graphs give similar results at the beginning and the end [but not the middle] or the model always overestimates the range oe e.g. (for incorrect sketches), similar interpretation as above but related to their two curves

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Question	Answer	Marks	Partial Marks
4(a)	Correct sketch	**1**	Ignore to the left of approx. (1, 0.1) **C** opportunity
4(b)	[0].25	**1**	Accept [0].249… to [0].250… **C** opportunity
4(c)	Unsuitable for velocities beyond approx 20 because range begins to reduce oe	**1**	**FT** $0 \leqslant k \leqslant 0.3$
Communication: seen in two of the following questions		**1**	
1(d)	Showing rearrangement e.g. $a = \frac{3.5}{\sin 20}$ or indicating a = maximum on the graph		
3(a)	Appropriate scale on r axis to allow maximum to be shown		
4(a)	Appropriate scale on R axis to allow 43.26 to be shown		
4(b)	Substitution of 15 in three places and 19.85 (i.e. $\frac{15^2}{9.81} - \frac{15^2 \times 2^{15k}}{981} = 19.85$)		

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