Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/61**

Paper 6 (Extended) **October/November 2016**

MARK SCHEME

Maximum Mark: 40

Published

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.

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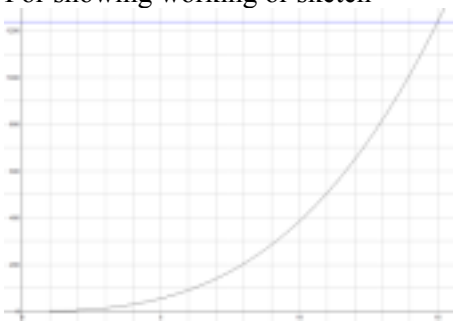
Abbreviations

awrt answers which round to
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 SQUARES ON GRIDS

Question	Answer	Mark	Part Marks
1 (a)	4 small and 1 large oe	**1**	
(b)	9 4 1 14	**1**	
(c)	16 9 4 1 30	**1**	If 0 scored in parts (b) and (c), **SC1** for 1, 4, 9, 16 (i.e. reverse order)
2 (a)	Size — Total 1 by 1 1 — **1** 2 by 2 **4** **1** — 5 3 by 3 **9** 4 **1** — 14 4 by 4 **16** **9** **4** **1** — 30 5 by 5 **25** **16** **9** **4** **1** — **55** 6 by 6 **36** **25** **16** **9** **4** **1** — **91**	**2**	**B1** for first 4 rows correct **B1** for rows 5 and 6 correct If 0 scored in parts 1(b) and 1(c) or SC in 1(c), **SC1** for first 4 rows correct, in reverse order AND **SC1** for rows 5 and 6 correct, in reverse order
(b)	Square [numbers]	**1**	
(c)	204	**1**	C opportunity
(d)	$(n-1)^2$ oe	**1**	
3 (a)	$d = 0$	**1**	
	$c = \frac{1}{6}$	**1**	C opportunity

Question	Answer	Mark	Part Marks
(b)	$T = \frac{1}{3}10^3 + \frac{1}{2}10^2 + \frac{1}{6}10$ leading to 385	1	
(c)	15	1	C opportunity
4	n	1	
5 (a)	11	1	
(b)	2 by 1 2 0 2 2 by 2 4 1 5 2 by 3 6 2 8 2 by 4 8 3 11 2 by 5 10 4 14 2 by n $2n$ $n-1$ $3n-1$ oe	1 1	
6	3 by 1 3 0 0 3 3 by 2 6 2 0 8 3 by 3 9 4 1 14 3 by 4 12 6 2 20 3 by 5 15 8 3 26 3 by n $3n$ $2n-2$ $n-2$ $6n-4$ oe	2	**B1** for rows 4 or 5 correct **B1 FT** for *their* linear expressions in columns 3, 4 and 5
7	$[n] < 3$ oe	1	C opportunity
Communication: Seen in two of the following questions		1	
2 (c)	For showing 91 + 49 + 64 or 1 + 4 + 9 + 16 + 25 + 36 + 49 + 64 or in tabular form		
3 (a)	For showing working of a correct method		
3 (c)	For showing working or sketch 		
7	For < 2 in 2 by something and < 3 in 3 by something oe		

B MODELLING MEASURING ROD			
Question	**Answer**	**Mark**	**Part Marks**
1 (a)	Cylinder	**1**	
(b)	152.7…cm oe	**2**	**M1** for $\frac{1200}{\pi \times 0.5^2}$ oe
2 (a)	Must be able to hold it oe	**1**	
(b) (i)	50	**1**	
(ii)	Cross-section narrows oe	**1**	
3 (a)	$\frac{1}{2} \times 50 \times 50 \times \sin x$	**1**	
(b)	$\frac{x}{360} \times \pi \times 50^2$	**1**	
	$21.81x$ to $21.82x$	**1**	
(c)	$21.8x - 1250\sin x$ isw	**1**	
(d)	*their* 3(c) × 153	**1**	**FT** *their* 3(c)
(e)	Correct curve	**2**	**B1** for correct shape **B1** for passing through approximately (80, 79 000) and approximately (150, 406 000)
(f) (i)	132 to 132.2	**1**	C opportunity
(ii)	29.6 to 29.75	**2**	**FT** *their* f(i) in $\cos\left(\frac{\text{f(i)}}{2}\right)$ **FT M1** for $50 \times \cos\left(\textit{their}\frac{132}{2}\right)$ oe C opportunity
(g)	70.2 to 70.3	**1**	**FT** 100 – *their* (f(ii))
4	13.7 or 13.74 to 13.75	**2**	**M1** for $\cos\left(\frac{\textit{their}87.05}{2}\right) \times 50$ implied by 36.2 to 36.3 C opportunity

Question	Answer	Mark	Part Marks
Communication: Seen in one of the following questions		**1**	
3 (f) (i)	seen in 3(e) For line on graph (sketch) at V = 300000		
3 (f) (ii)	For working shown i.e. extra stage like division by 2 or cos *their* angle		
4	seen in 3(e) For line on graph (sketch) at V = 100000 or $x = 87.0$[5]		