CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/51**

Paper 5 (Core) **October/November 2016**

MARK SCHEME

Maximum Mark: 24

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

Question		Answer	Mark	Part Marks
1		4 small and 1 large oe	**1**	
2		9 4 1 14	**2**	**B1** for 9 and 1 **B1FT** for sum of *their* 1, 4 and *their* 9
3		16 9 4 1 30	**2**	**B1** for either 9 or 4 If reverse order in question 2 then **SC2** for reverse order
4	**(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**	**3**	**B1** for rows 2 to 4 correct **B1** for row 5 correct **B1** for row 6 correct If 0 scored **SC1** for one of columns 2, 3 or 4 correct If reverse order in question 2 then **SC1** for rows 2 to 4 with reverse sequence **SC1** for row 5 with reverse sequence **SC1** for row 6 with reverse sequence
	(b)	Square [numbers]	**1**	
	(c)	204	**2**	**B1** for 49 and 64 seen C opportunity
	(d)	n^2 $(n-1)^2$ $(n-2)^2$ $(n-3)^2$ **.....** $(n-5)^2$	**2**	**B1** for 2 correct
	(e)	$(n-11)^2$ oe	**1**	
	(f) **(i)**	256	**1**	C opportunity
	(ii)	10	**1**	C opportunity

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Question	Answer	Mark	Part Marks
5 **(a)**	$1 = \frac{1}{3} + \frac{1}{2} + \frac{1}{6} + d$ so $d = 0$ oe	1	
(b)	$\frac{4^3}{3} + \frac{4^2}{2} + \frac{4}{6} = 30$ soi	1	
(c)	385	2	**M1** for $\frac{10^3}{3} + \frac{10^2}{2} + \frac{10}{6}$ or $91 + 7^2 + 8^2 + 9^2 + 10^2$ oe
6 **(a)**	The upper right corner of the large square can be put on any of the nine points in the 2 by 2 square oe or Use the 5 surrounding squares and the 4 squares inside the 2 by 2 square oe	1	

(b)	Two from:
	    10 by 10 on 14 by 14
	    11 by 11 on 15 by 15
	    12 by 12 on 16 by 16 etc.
		2	**B1** for one
			
			C opportunity

Communication: Seen in two of the following questions		1	
4 **(c)**	For showing $91 + 49 + 64$ or $1 + 4 + 9 + 16 + 25 + 36 + 49 + 64$ or tabular form (without plus signs)		
4 **(f)** **(i)**	For $(n - 4)^2$ or *their* $(20 - 4)^2$ oe		
4 **(f)** **(ii)**	For $(n - 4)^2 = 36$ or $(10 - 4)^2 = 36$ or $\sqrt{36} = 6$ or $6 + 4 = 10$ or <table><tr><td>8</td><td>9</td><td>10</td></tr><tr><td>16</td><td>25</td><td>36</td></tr></table> or for a 10 by 10 grid there are 100, 81, 64, 49, **36** squares		
6 **(b)**	For a square of side 4 or 4 by 4 seen or used		