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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/61 Paper 6 (Extended), maximum raw mark 40

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A INVESTIGATION CUBES

1	**(a)**	8	**1**	
	(b)	Response implying some faces hidden within the large cube	**1**	bod 'can't see'
	(c)	24	**1FT**	3 × *their* **(a)**
2	**(a)**	27	**1**	
	(b)	8	**1**	
	(c)	6	**1**	
3			**2**	**B1** for 125 and 36 or **B1** for first 3 rows correct

Size of cube	Total number of small cubes	Number of small cubes with			
		0 crosses	1 cross	2 crosses	3 crosses
2 by 2 by 2	**8**	0	0	**0**	**8**
3 by 3 by 3	**27**	1	**6**	12	**8**
4 by 4 by 4	64	8	24	**24**	**8**
5 by 5 by 5	**125**	27	54	**36**	8

4	**(a)**	1 small cube with 0 crosses gives 0 crosses **6** small cubes with 1 cross gives 6 crosses 12 small cubes with 2 crosses gives **24** crosses **8** small cubes with 3 crosses gives **24** crosses Total = **54** crosses	**1**	
	(b)	9 54	**1**	
	(c)	96	**1**	**C** opportunity
	(d)	$6n^2$ oe	**1**	**C** opportunity
5		$(n-2)^3$ oe isw	**2**	**B1** for $[kn] - 2$ for n^3 soi **C** opportunity
6		Yes oe and $n = 8$ oe or 216 seen	**1**	**SC1** for $n = 2$ and cubes = 8 with working shown e.g. sketch

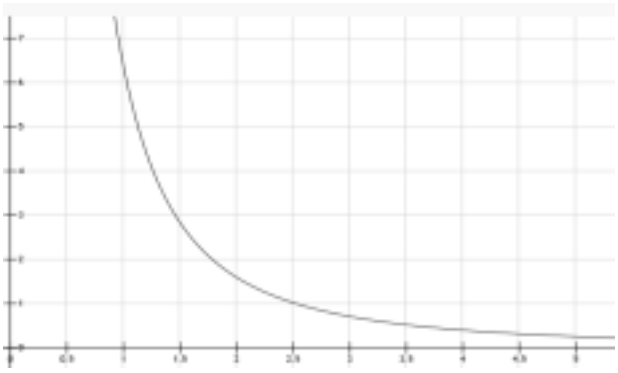
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7	$12(n-2)$ oe	**1**	**C** opportunity
8 **(a)**	216	**1**	**C** opportunity
(b)	150	**2**	**B1** for $n = 7$ soi If 0 scored **SC1 FT** *their* **7** = 60 followed by *their n* in $6(n-2)^2$ *n* must be integer **C** opportunity
	Communication seen in at least two of **4(c)**, **4(d)**, **5**, **7**, **8(a)** or **8(b)**	**1**	

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B	MODELLING	FISH PONDS		
1	(a)	$\frac{1}{2}\times\frac{4}{3}\times\pi\times3^3$ oe	1	seen through working
	(b)	$\pi\times d^2\times d$	1	
	(c)	[cylinder =] 27π [and] [hemisphere =] 18π oe	1	accept $[H=]\frac{2}{3}\pi r^3$ and $[C=]\pi r^3$
	(d)	$\frac{2}{3}\pi r^3 = \pi d^3$	1	
2	(a)	13.5 [m^3]	3	**M2** for $\frac{15\times18\times5}{0.1}$ oe or **M1** $\frac{15\times18}{0.1}$ or better soi by 2700 or $\frac{20\times5}{0.1}$ or better **C** opportunity
	(b)	$W = 0.05FL$ oe	1	
	(c) (i)	16 [fish]	2FT	**B1** for 16.6[…] or **FT** *their* 16.6[…] **C** opportunity
	(ii)	2.1… to 2.19	1	**C** opportunity
	(iii)	1.85[…] [m] or 1.86[m]	1	Accept cube root of $\frac{20}{\pi}$ If 0 scored in **(i)** and in **(ii)** **SC1** for same converting error in both **C** opportunity

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3	**(a)**	$d = \frac{20}{\pi r^2}$ oe	**1**	
	(b)		**2**	**1** for shape **1** for not reaching either axis between $y = 7$ and $x = 5$
	(c)	Too deep oe	**1**	
	(d)	2.52[m] 2.522 to 2.523…	**1**	**C** opportunity
4	**(a)**	$d = \frac{20}{\pi r^2} + 0.3$	**1FT**	**FT** *their* **3(a)** + 0.3
	(b)	Translates [up by] 0.3 oe	**1FT**	**FT** *their* + 0.3
		Communication seen in two or more of **2(a)**, **2(c)(i)**, **2(c)(ii)**, **2(c)(iii)** or **3(d)**	**1**	

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