

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

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

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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A INVESTIGATION CUBES																																					
1	(a)	8	1																																		
	(b)	Response implying some faces hidden within the large cube	1																																		
	(c)	24	1FT																																		
			3 × their (a)																																		
2	(a)	27	1																																		
	(b)	8	1																																		
	(c)	6	1																																		
3		<table border="1"> <thead> <tr> <th rowspan="2">Size of cube</th> <th rowspan="2">Total number of small cubes</th> <th colspan="4">Number of small cubes with</th> </tr> <tr> <th>0 crosses</th> <th>1 cross</th> <th>2 crosses</th> <th>3 crosses</th> </tr> </thead> <tbody> <tr> <td>2 by 2 by 2</td> <td>8</td> <td>0</td> <td>0</td> <td>0</td> <td>8</td> </tr> <tr> <td>3 by 3 by 3</td> <td>27</td> <td>1</td> <td>6</td> <td>12</td> <td>8</td> </tr> <tr> <td>4 by 4 by 4</td> <td>64</td> <td>8</td> <td>24</td> <td>24</td> <td>8</td> </tr> <tr> <td>5 by 5 by 5</td> <td>125</td> <td>27</td> <td>54</td> <td>36</td> <td>8</td> </tr> </tbody> </table>	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	2
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																																
			B1 for 125 and 36 or B1 for first 3 rows correct																																		
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																																		
	(d)	$6n^2$ oe	1																																		
			C opportunity																																		
			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																																		

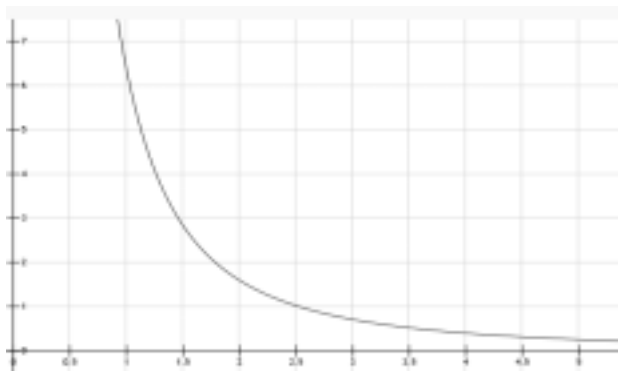
Page 3	Mark Scheme	Syllabus	Paper
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7	$12(n-2)$ oe	1	C opportunity
8 (a)	216	1	C opportunity
(b)	150	2	<b>B1</b> for $n = 7$ soi If 0 scored <b>SC1 FT</b> <i>their</i> $7 = 60$ followed by <i>their</i> $n$ in $6(n-2)^2$ $n$ must be integer C opportunity
	Communication seen in at least two of <b>4(c), 4(d), 5, 7, 8(a)</b> or <b>8(b)</b>	1	

Page 4	Mark Scheme	Syllabus	Paper
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B MODELLING FISH PONDS			
1	(a)	$\frac{1}{2} \times \frac{4}{3} \times \pi \times 3^3$ oe	1 seen through working
	(b)	$\pi \times d^2 \times d$	1
	(c)	[cylinder =] $27\pi$ [and] [hemisphere =] $18\pi$ oe	1 accept $[H =] \frac{2}{3} \pi r^3$ and $[C =] \pi r^3$
	(d)	$\frac{2}{3} \pi d^3 = \pi d^3$	1
2	(a)	13.5 [m <sup>3</sup> ]	3 <b>M2</b> for $\frac{15 \times 18 \times 5}{0.1}$ oe or <b>M1</b> $\frac{15 \times 18}{0.1}$ or better soi by 2700 or $\frac{20 \times 5}{0.1}$ or better <b>C</b> opportunity
	(b)	$W = 0.05FL$ oe	1
	(c) (i)	16 [fish]	<b>2FT</b> <b>B1</b> for 16.6[...] or <b>FT</b> <i>their</i> 16.6[...] <b>C</b> opportunity
	(ii)	2.1... to 2.19	1 <b>C</b> 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) <b>SC1</b> for same converting error in both <b>C</b> opportunity

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