



Published

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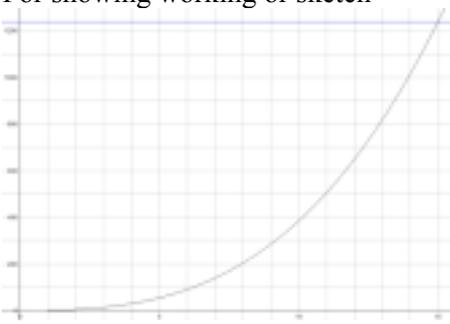
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Abbreviations

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)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Size</td> <td></td> <td>Total</td> </tr> <tr> <td>1 by 1</td> <td>1</td> <td>1</td> </tr> <tr> <td>2 by 2</td> <td>4 1</td> <td>5</td> </tr> <tr> <td>3 by 3</td> <td>9 4 1</td> <td>14</td> </tr> <tr> <td>4 by 4</td> <td>16 9 4 1</td> <td>30</td> </tr> <tr> <td>5 by 5</td> <td>25 16 9 4 1</td> <td>55</td> </tr> <tr> <td>6 by 6</td> <td>36 25 16 9 4 1</td> <td>91</td> </tr> </table>	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	
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																							
(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)	<table style="border: none;"> <tr><td>2 by 1</td><td>2</td><td>0</td><td>2</td><td></td></tr> <tr><td>2 by 2</td><td>4</td><td>1</td><td>5</td><td></td></tr> <tr><td>2 by 3</td><td>6</td><td>2</td><td>8</td><td></td></tr> <tr><td>2 by 4</td><td>8</td><td>3</td><td>11</td><td></td></tr> <tr><td>2 by 5</td><td>10</td><td>4</td><td>14</td><td></td></tr> <tr><td>2 by n</td><td>$2n$</td><td>$n - 1$</td><td>$3n - 1$</td><td>oe</td></tr> </table>	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							
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																																			
6	<table style="border: none;"> <tr><td>3 by 1</td><td>3</td><td>0</td><td>0</td><td>3</td><td></td></tr> <tr><td>3 by 2</td><td>6</td><td>2</td><td>0</td><td>8</td><td></td></tr> <tr><td>3 by 3</td><td>9</td><td>4</td><td>1</td><td>14</td><td></td></tr> <tr><td>3 by 4</td><td>12</td><td>6</td><td>2</td><td>20</td><td></td></tr> <tr><td>3 by 5</td><td>15</td><td>8</td><td>3</td><td>26</td><td></td></tr> <tr><td>3 by n</td><td>$3n$</td><td>$2n - 2$</td><td>$n - 2$</td><td>$6n - 4$</td><td>oe</td></tr> </table>	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 <i>their</i> linear expressions in columns 3, 4 and 5
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																																		
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																																						

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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 – 1250sinx 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 $\cos\left(\frac{f(i)}{2}\right)$ FT M1 for $50 \times \cos\left(\text{their } \frac{132}{2}\right)$ 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 $\cos\left(\frac{\text{their } 87.05}{2}\right) \times 50$ implied by 36.2 to 36.3 C opportunity

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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 <i>their</i> angle		
4	seen in 3(e) For line on graph (sketch) at $V = 100000$ or $x = 87.0[5]$		