



Published

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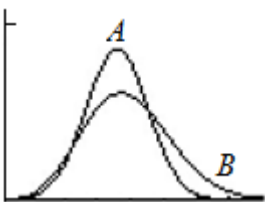
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Abbreviations

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	TRIANGULAR GRIDS																										
Question		Answer		Marks	Part Marks																								
1	(a)	10		1																									
	(b)	36		1																									
	(c)	[A =] $2rs$ oe		1																									
	(d)	16		1																									
	(e)	[A =] x^2		1																									
	(f)	Diagram (+ area stated)+ reference to $A = x^2$		1																									
2	(a)	<table border="1"> <thead> <tr> <th>Shape</th> <th>Dots inside shape (R)</th> <th>Dots on perimeter (P)</th> <th>Area in triangles (A)</th> </tr> </thead> <tbody> <tr> <td>B</td> <td>0</td> <td>6</td> <td>4</td> </tr> <tr> <td>C</td> <td>0</td> <td>5</td> <td>3</td> </tr> <tr> <td>D</td> <td>0</td> <td>7</td> <td>5</td> </tr> <tr> <td>E</td> <td>0</td> <td>9</td> <td>7</td> </tr> <tr> <td>F</td> <td>0</td> <td>4</td> <td>2</td> </tr> </tbody> </table>		Shape	Dots inside shape (R)	Dots on perimeter (P)	Area in triangles (A)	B	0	6	4	C	0	5	3	D	0	7	5	E	0	9	7	F	0	4	2	2	B1 for 5 or 6 cells correct B1 for clear attempt to substitute figures from the table into Pick's rule B1 for $A = P + 2R + k$ or $A = P + kR - 2$ ($k \neq 0$) Dependent on B1 in part (d)
		Shape	Dots inside shape (R)	Dots on perimeter (P)	Area in triangles (A)																								
		B	0	6	4																								
		C	0	5	3																								
		D	0	7	5																								
		E	0	9	7																								
F	0	4	2																										
(b)	No, supported by one correct calculated substitution		2																										
(c)	$A = P - 2$ oe isw		1																										
(d)	$A = P + 2R - 2$ oe		2																										
(e)	R and P which satisfy <i>their</i> formula		1																										

Question	Answer	Marks	Part Marks
3 (a)	True oe and drawing of regular hexagon	1	
(b)	True oe and two points plotted to show statement is true.	1	C opportunity
(c)	False oe and two points plotted to show statement is false	1	C opportunity
(d)	True oe Two points plotted to show statement is true.	1 1	C opportunity
Communication: Seen in one of the following questions		1	
3 (b)	Co-ordinates shown		
3 (c)	Co-ordinates shown		
3 (d)	Co-ordinates shown		

B MODELLING MODELLING WAVES			
Question	Answer	Marks	Part Marks
1 (a)	2.918 to 2.919	1	C opportunity
(b) (i)	Relevant comparison between 5.836 to 5.84 (2H) and 5.20	1	
(ii)	Mean of 6 highest waves = 3.855 to 3.86 Relevant comparison with $1.27 \times 2.92 = 3.708$ to 3.71	2	B1 for each C opportunity
2 (a)	 <p>Correctly shaped and labelled sketches</p>	2	B1 for each If zero scored SC1 for correct sketch but no, or incorrect, labels
(b)	1.8	1	
(c)	1.86 to 1.862 ...	1	If 0 scored in (b) SC1 for correct answers switched between (b) and (c)
(d)	B and two valid reasons	2	B1 for B and one valid reason,

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Question	Answer	Marks	Part Marks
3 (a) (i)	$s = 3.2$	1	B1 for each, dependent on correct (b)(i) If zero scored SC1 for correct substitution into <i>their</i> model twice. C opportunity
(ii)	Speed doesn't change with height	1	
(b) (i)	$s = a\sqrt{d} + c$	1	
(ii)	$a = 2.99$ to 3.24 $c = -0.1$ to 0.11	2	
(c)	1.75 to 2.15	4	B1 for 170 [m] B1 for $s = 4.25$ to 4.5 or B1 FT $\frac{\text{their}170}{\text{their}40}$ equated M1 for substituting <i>their a, c,</i> and <i>s</i> into <i>their</i> model
Communication: Seen in two of the following questions		1	
1 (a)	$\frac{1}{3} = 20$		
1 (a)	All numbers added and \div <i>their</i> 20		
1 (a)	<i>their</i> 58.37 \div <i>their</i> 20		
1 (b) (ii)	10% of 60 = 6		
3 (c)	<i>their</i> m converted to cm e.g. 17cm = 170cm		
3 (c)	$\frac{\text{their}170}{\text{their}40}$		