

8. An answer sheet is provided for this question.

Sarah is making a pattern of squares using straws. She uses four straws for the sides and two longer straws for the diagonals. The first three figures in her sequence of shapes are shown below:

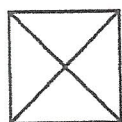


Figure 1

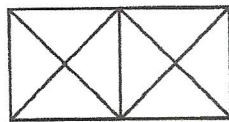


Figure 2

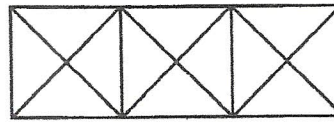


Figure 3

- (a) On your answer sheet, draw Figure 4, the FOURTH shape in the pattern. (2 marks)
- (b) On your answer sheet, complete the TWO rows in the table for
- (i) Figure 4
- (ii) Figure 10.

Total Number of Straws		
Figure	Formula	Number
1	$1(6) - 0$	6
2	$2(6) - 1$	11
3	$3(6) - 2$	16
(i) 4		
(ii) 10		

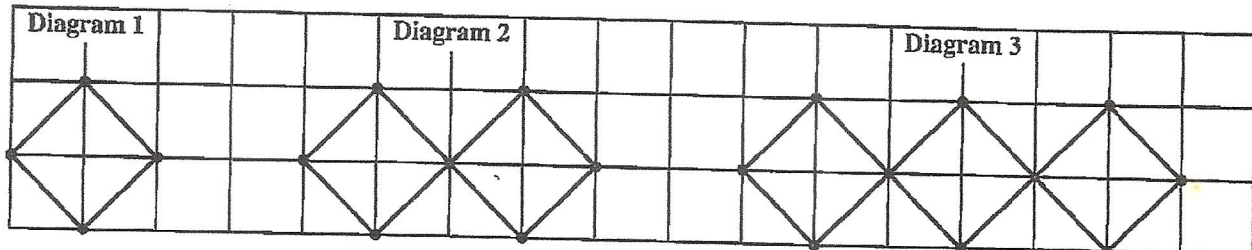
- (4 marks)
- (c) Which figure in the sequence uses 106 straws? (2 marks)
- (d) Obtain an expression in n , for the total number of straws used in the n^{th} pattern. (2 marks)

Total 10 marks

GO ON TO THE NEXT PAGE

8. An answer sheet is provided for this question.

The figure below shows the first three diagrams in a sequence. Each diagram is made up of sticks joined at the ends by thumb tacks. The sticks are represented by lines and the thumb tacks by dots. In each diagram, there are t thumb tacks and s sticks.



On the answer sheet provided:

- (a) Draw the FOURTH diagram in the sequence. (2 marks)
- (b) (i) How many sticks are in the SIXTH diagram? (1 mark)
(ii) How many thumb tacks are in the SEVENTH diagram? (1 mark)
- (c) Complete the table by inserting the missing values at the rows marked (i) and (ii).

	No. of Sticks s	Rule Connecting t and s	No. of Thumb Tacks t	
	4	$1 + \left(\frac{3}{4} \times 4\right)$	4	
	8	$1 + \left(\frac{3}{4} \times 8\right)$	7	
	12	$1 + \left(\frac{3}{4} \times 12\right)$	10	
(i)	52	_____	_____	(2 marks)
(ii)	_____	_____	55	(2 marks)

- (d) Write the rule, in terms of s and t , to show how t is related to s . (2 marks)

Total 10 marks