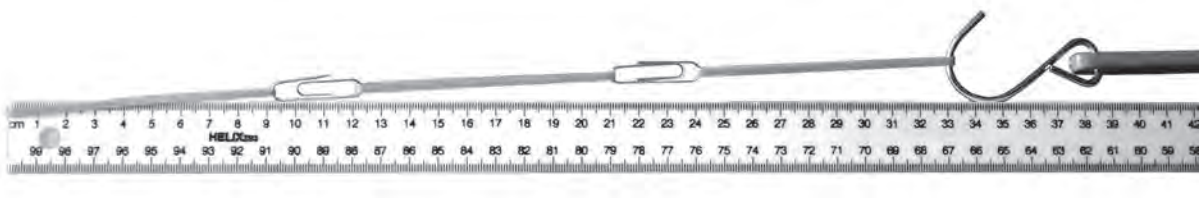
3 A student makes chains of elastic bands by joining them together with paperclips.

He uses a newtonmeter to stretch each chain along a metre rule, as shown in photograph **A**.



Photograph A

For each chain, he records

- the number of elastic bands
- the length when the tension is 2 N
- the length when the tension is 1 N

Then he calculates the difference in length for each chain.

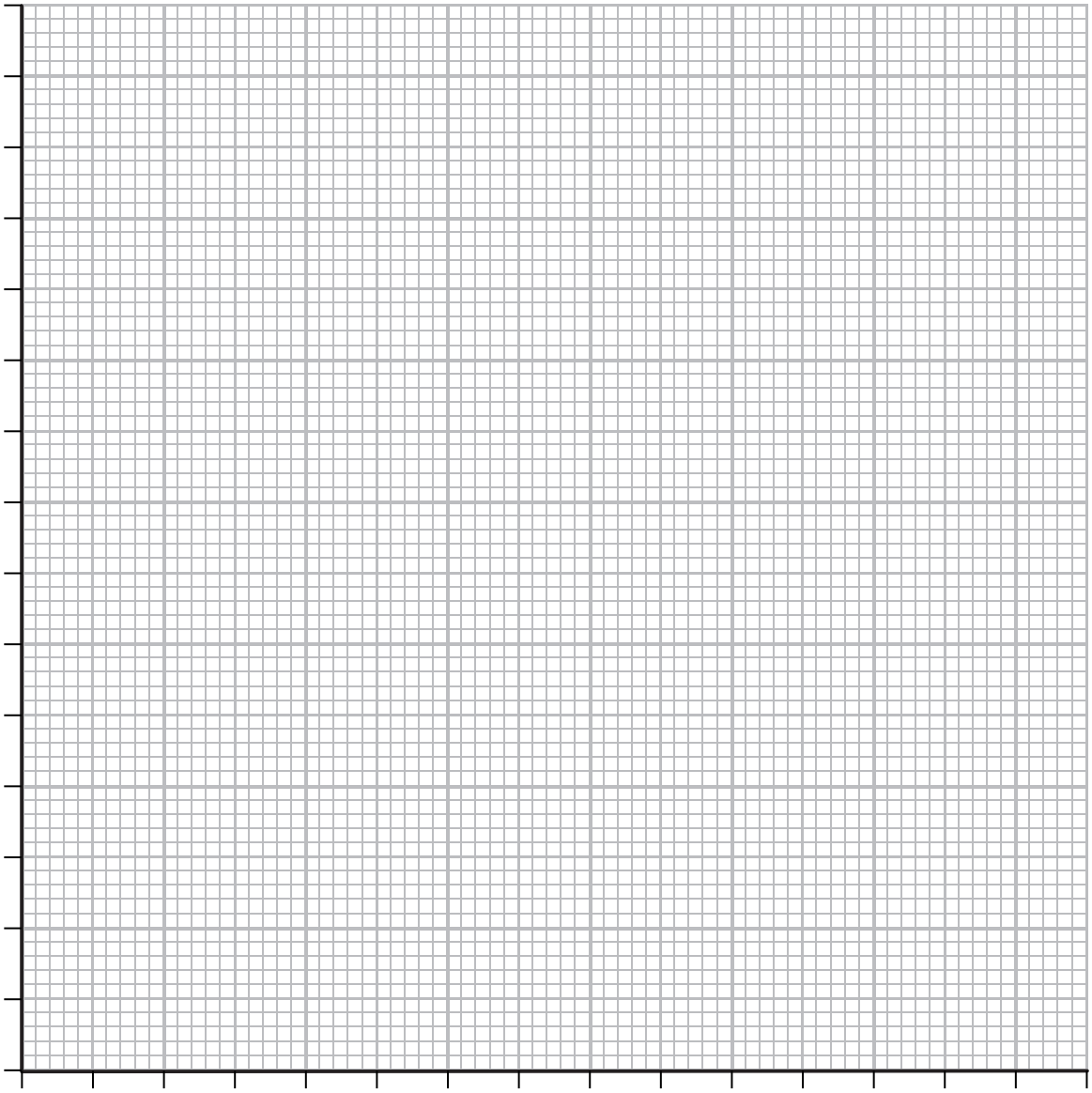
(a) (i) Complete the table by calculating the missing value.

(1)

Number of elastic bands	Length in cm		Difference in length in cm
	When tension = 2 N	When tension = 1 N	
1	8.1	7.5	0.6
2	20.2	18.2	2.0
3	31.7	29.3	2.4
4	43.7	40.3	3.4
5	56.3	51.6	4.7
6	67.6	62.5	

(ii) Use the grid to plot a graph to show the relationship between the number of elastic bands and the difference in length.

(5)



(iii) Describe your line of best fit.

(2)

.....

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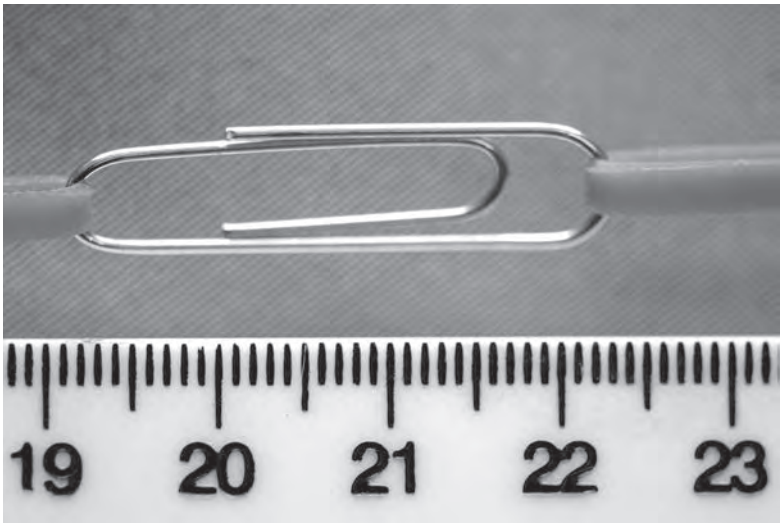
(b) Photograph **B** shows a paperclip in one of the chains against the same metre rule.



Photograph B

Use photograph **B** to estimate the length of this paperclip.

(2)

Length = ... cm

(c) Look again at photograph **A**.

Suggest two ways that the student could improve his measuring technique.

(2)

1 .....

.....

2 .....

.....

(Total for Question 3 = 12 marks)