

0	1
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Thom is investigating how the extension of a spring is affected by the force applied to it. He obtains the below data.

Force (N)	Extension (cm)	Corrected extension (cm)
0	10	
1	15	
2	20	
3	25	
4	30	
5	35	
6	40	
7	50	
8	70	

0	1
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 .

1

Thom has incorrectly measured the spring extension for each applied force. Suggest a mistake which he may have made during his experiment.

[1 mark]

0	1
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 .

2

What is the name given to the type of error which his mistake introduced to the extension measurements?

[1 mark]

0	1
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 .

3

What was the independent variable in this investigation?

[1 mark]

0	1
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 .

4

By performing appropriate calculations, determine the correct extension for each force. Write your answers into the right-hand column of the above table.

[2 marks]

0	1
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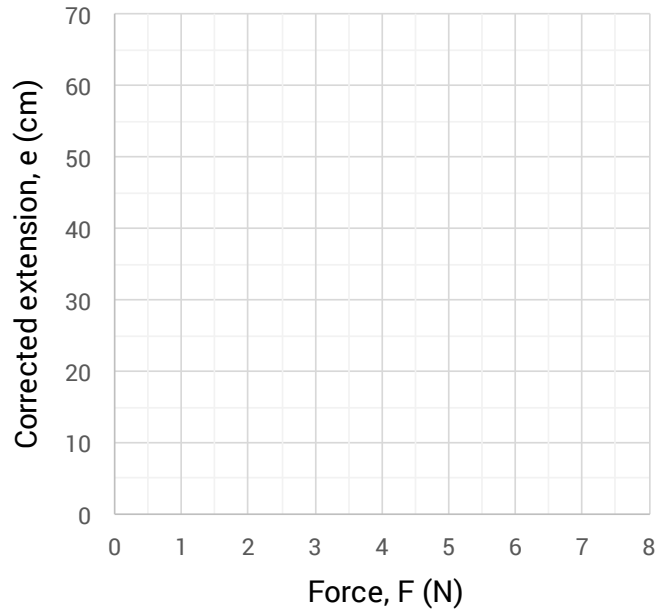
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5

On the following page, plot a graph of corrected extension against force for the spring.

[4 marks]

0 1 . 5



0 1 . 6

Using the above graph (or otherwise), determine the spring constant of the spring which Thom used in his investigation.

Spring constant = _____ N/m

[2 marks]

0 1 . 7

On the above graph, **circle** the point which marks the limit of proportionality of the spring.

[1 mark]

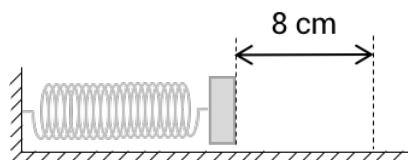
0 1 . 8

Describe the relationship between force and extension when the spring has been extended beyond its limit of proportionality.

[1 mark]

0 2

The spring of the launching mechanism inside a pinball machine can be pulled back by a maximum distance of 8 cm, as shown below. If its spring constant is 250 N/m, calculate the maximum amount of energy which the launching mechanism can transfer to a pinball.



Energy = _____ J

[3 marks]