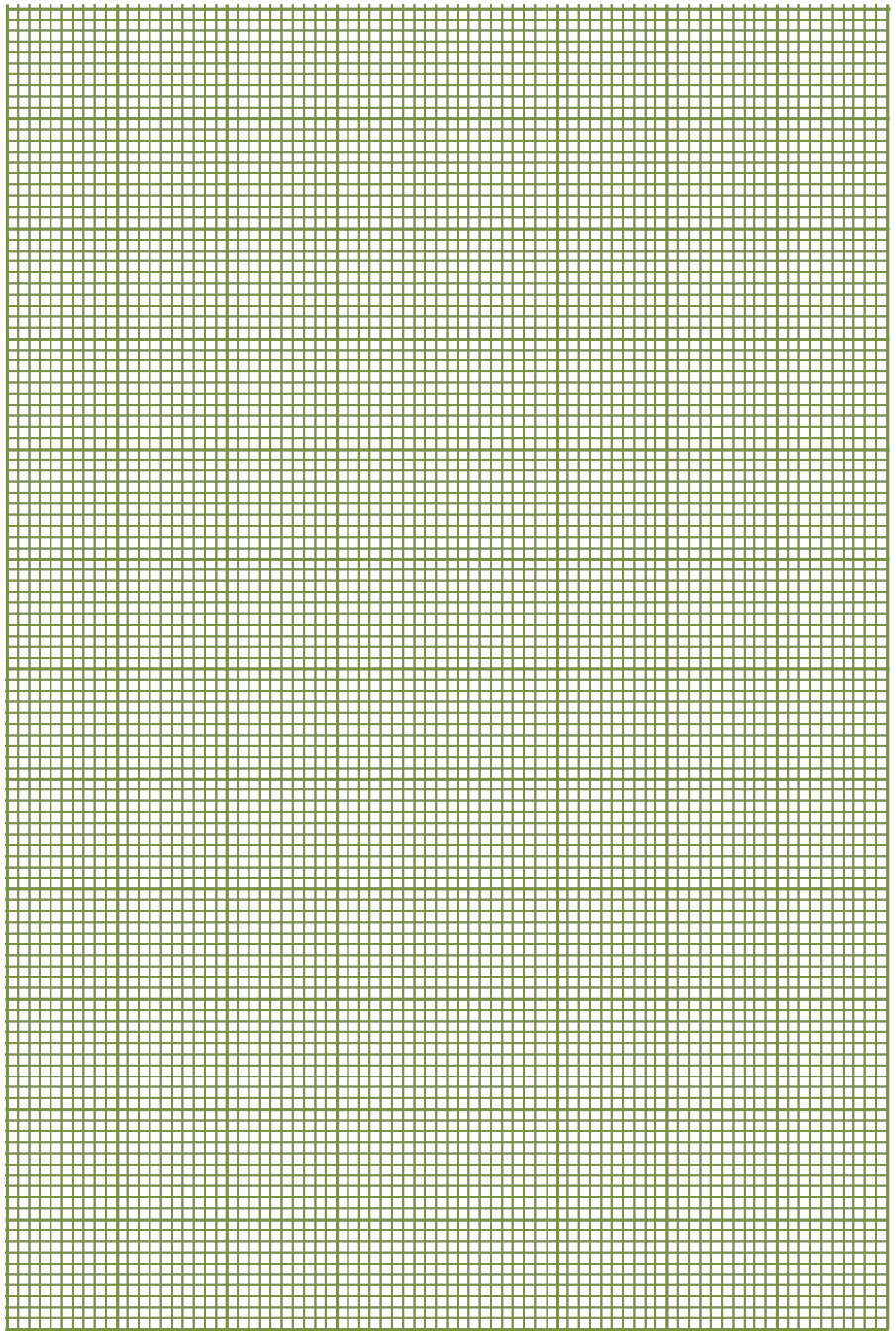
Practical Skills Guide
(Graph Drawing and Gradient Calculation)

Graph Drawing

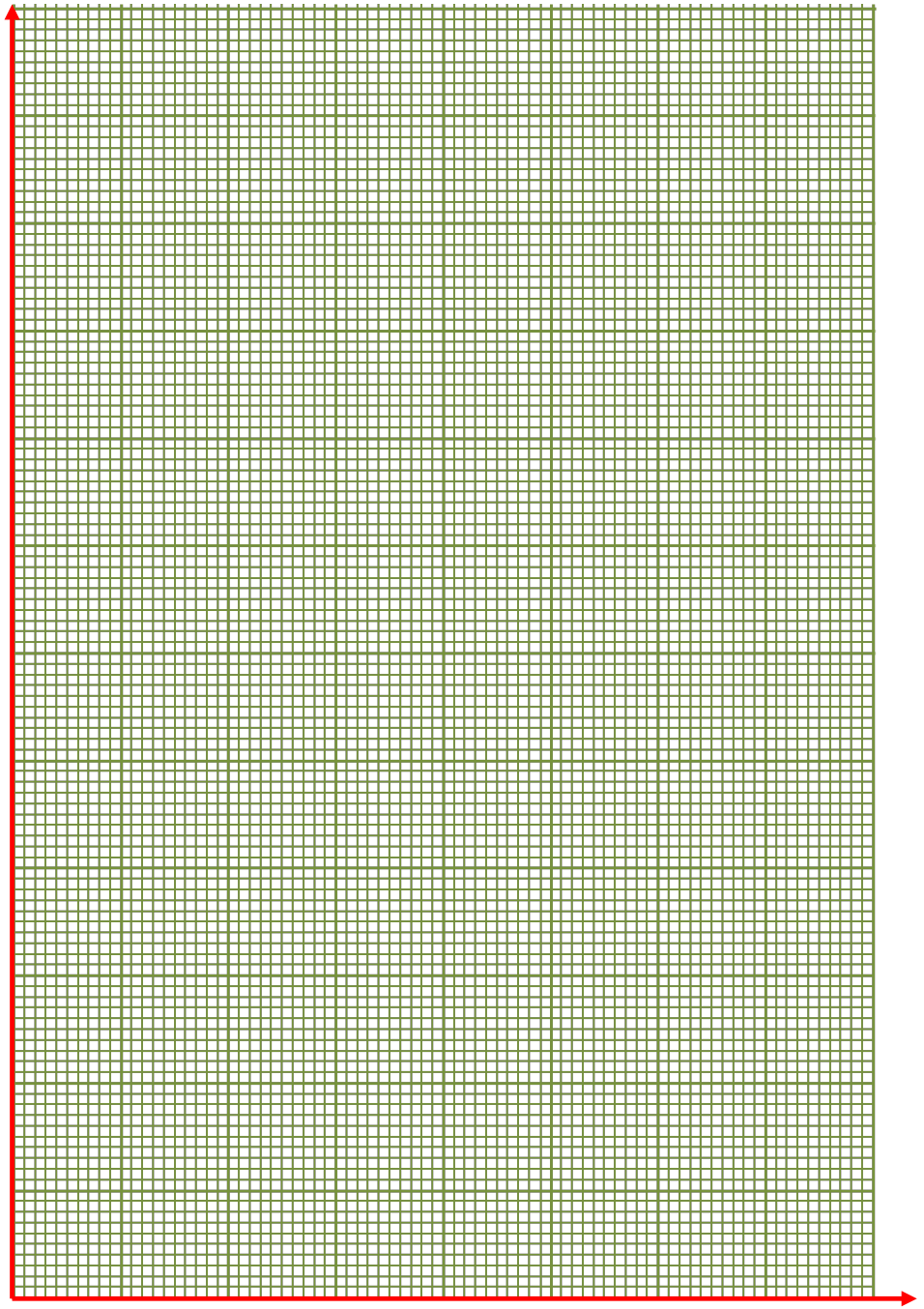
L / m	Time for 20 Oscillations			T / s	T^2 / s^2
	t_1 / s	t_2 / s	t_{av} / s		
0.800	35.8	35.8	35.8	1.79	3.20
0.700	33.5	33.6	33.6	1.68	2.82
0.600	29.9	31.1	30.5	1.53	2.33
0.500	28.3	28.4	28.4	1.42	2.02
0.300	21.7	21.9	21.8	1.09	1.19

Plot the graph of T^2 against L.



Plot the graph of T^2 against L.

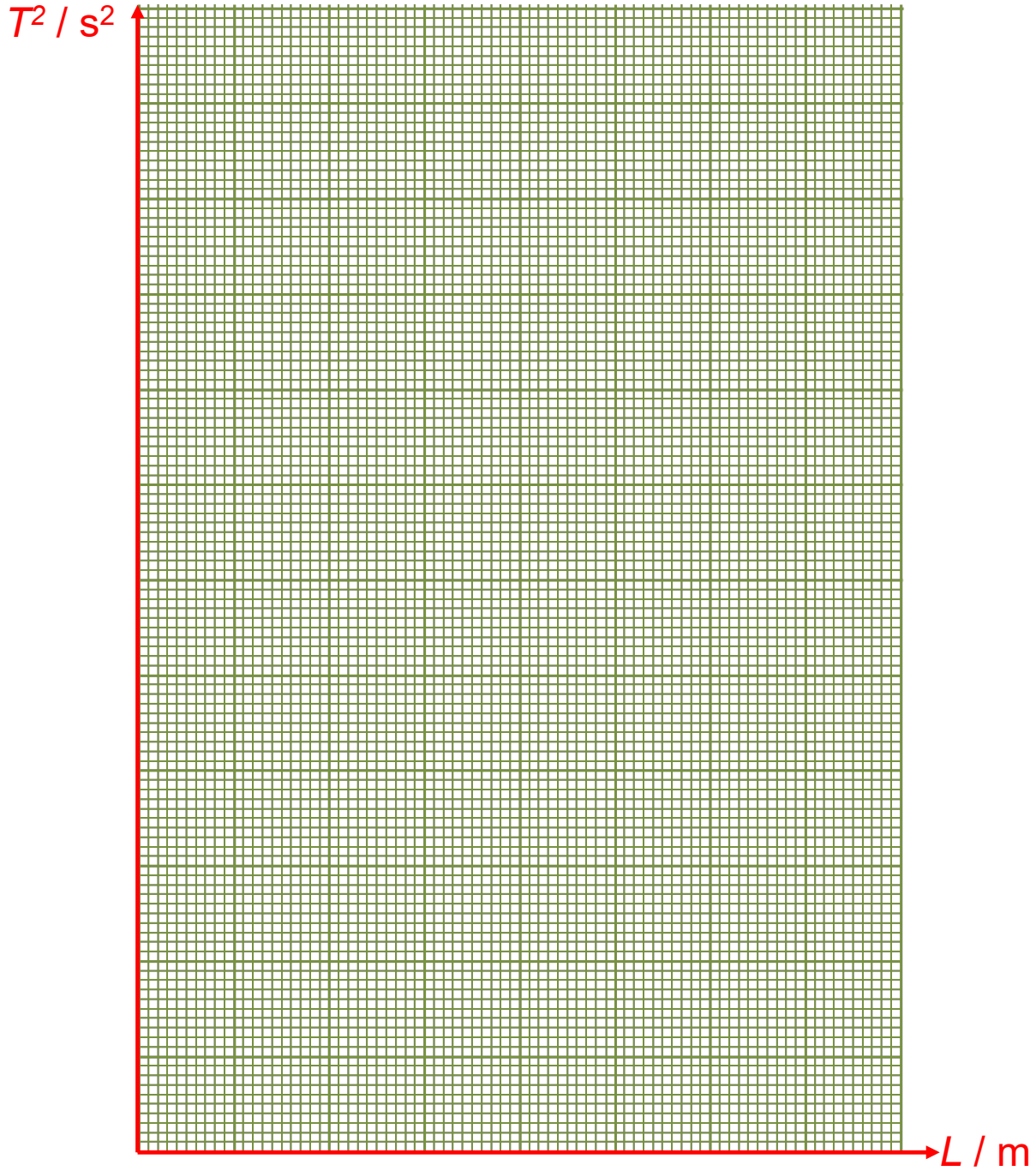
1: Draw the axes at the edge of the graph for both axes.



Plot the graph of T^2 against L.

1: Draw the axes at the edge of the graph for both axes.

2: Label each axis based on the heading in the table.
x-axis: L / m
y-axis: T^2 / s^2



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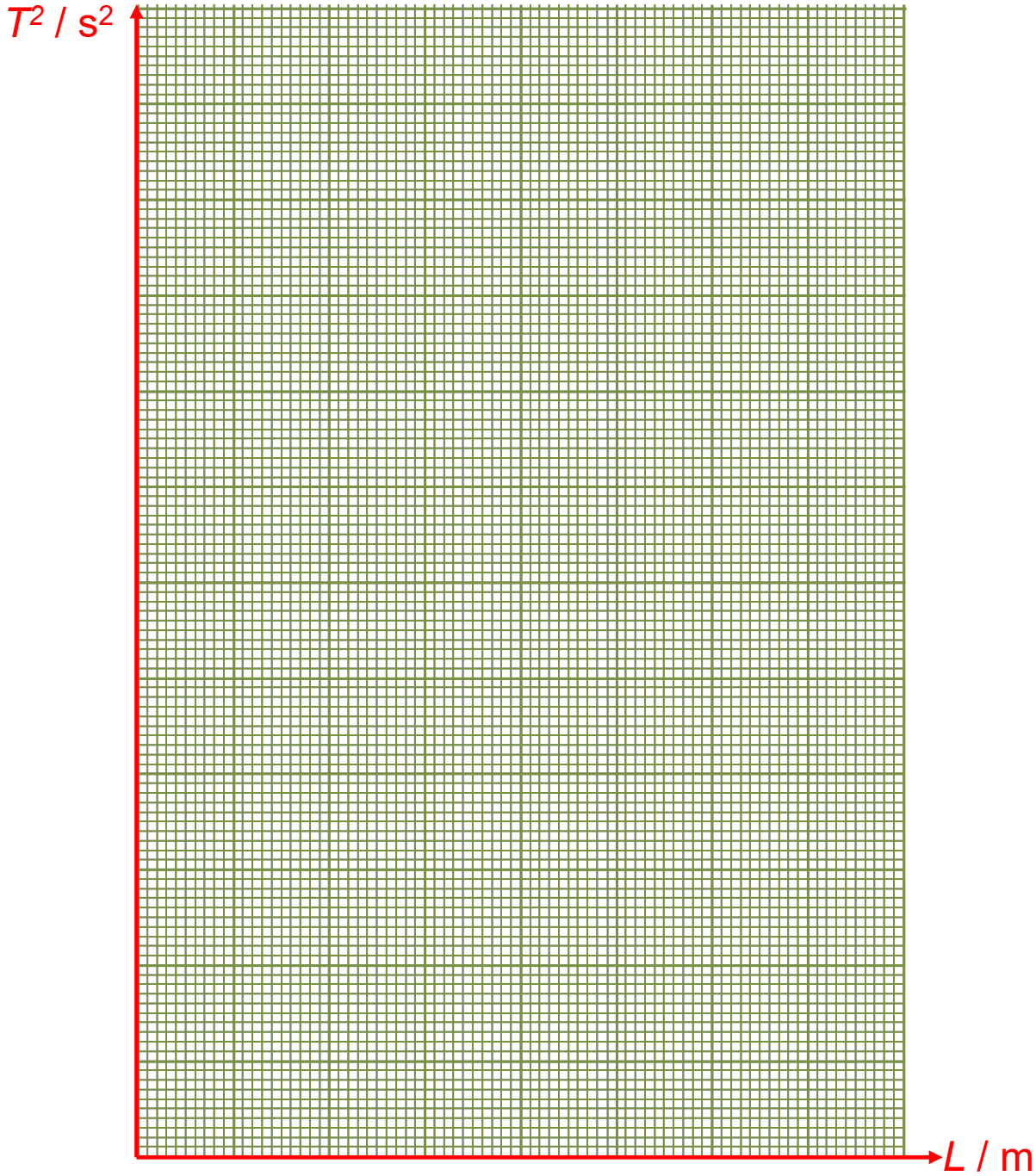
3: Identify the scale to be used for each axis.
We use the following method:
(max value on graph – min value on graph) / (number of intervals)
We then round up to the nearest appropriate scale

x-axis: (0.800 – 0.300) / 8 = 0.0625
Round up to 0.10 for each interval.

y-axis: (3.20 – 1.10) / 12 = 0.175
Round up to 0.20 for each interval.



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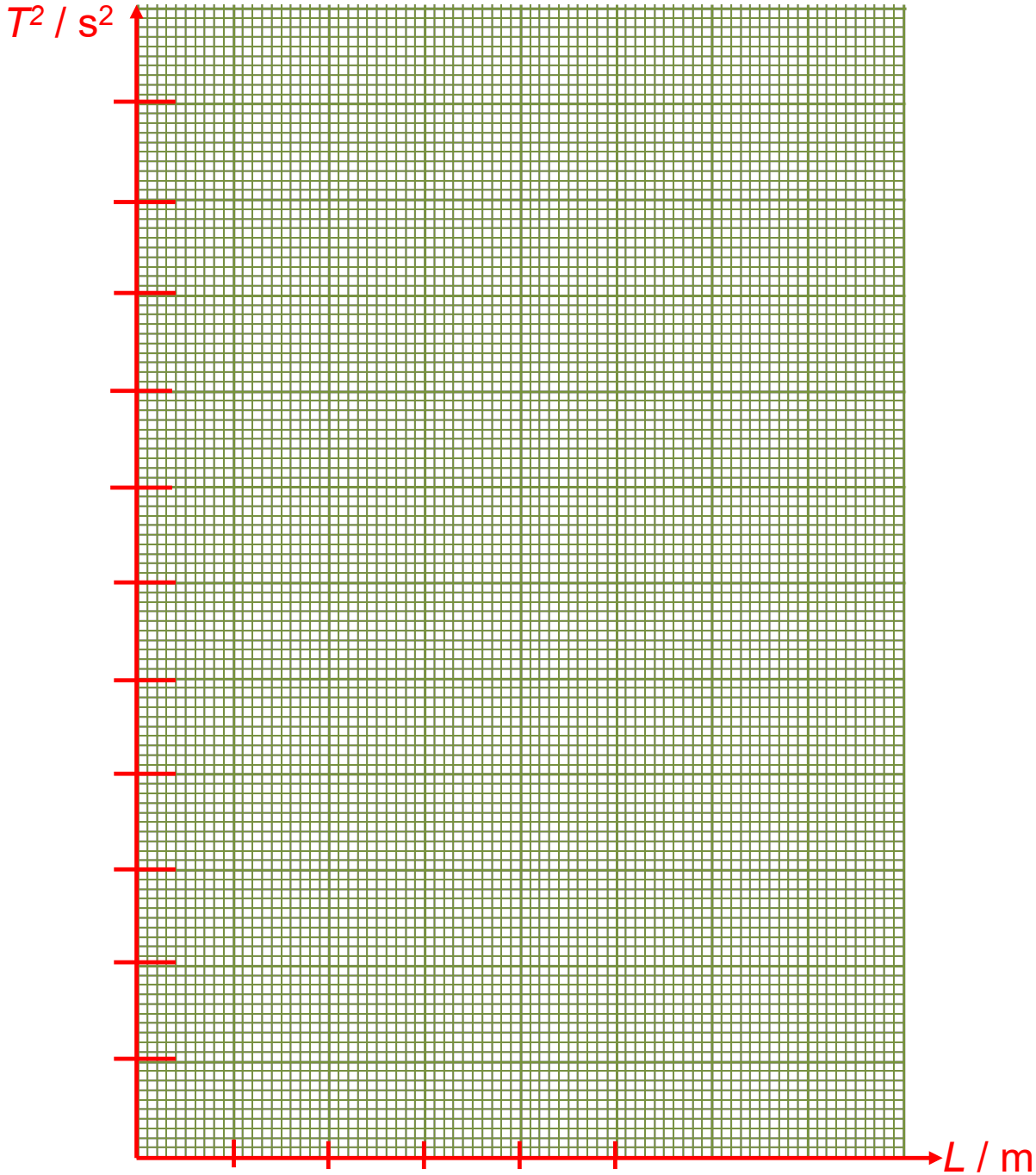
4: Label each interval on the graph i.e. each big square.



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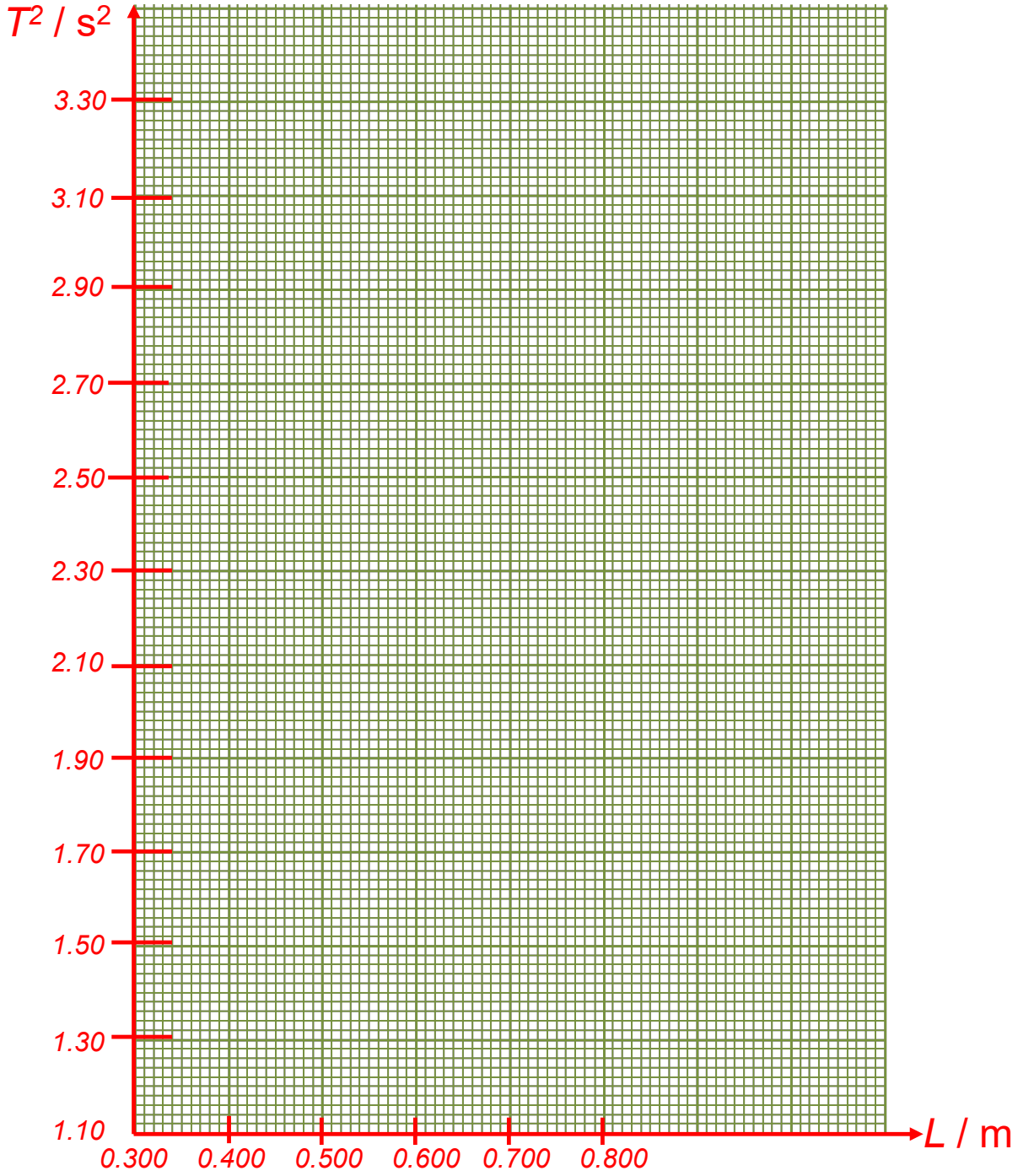

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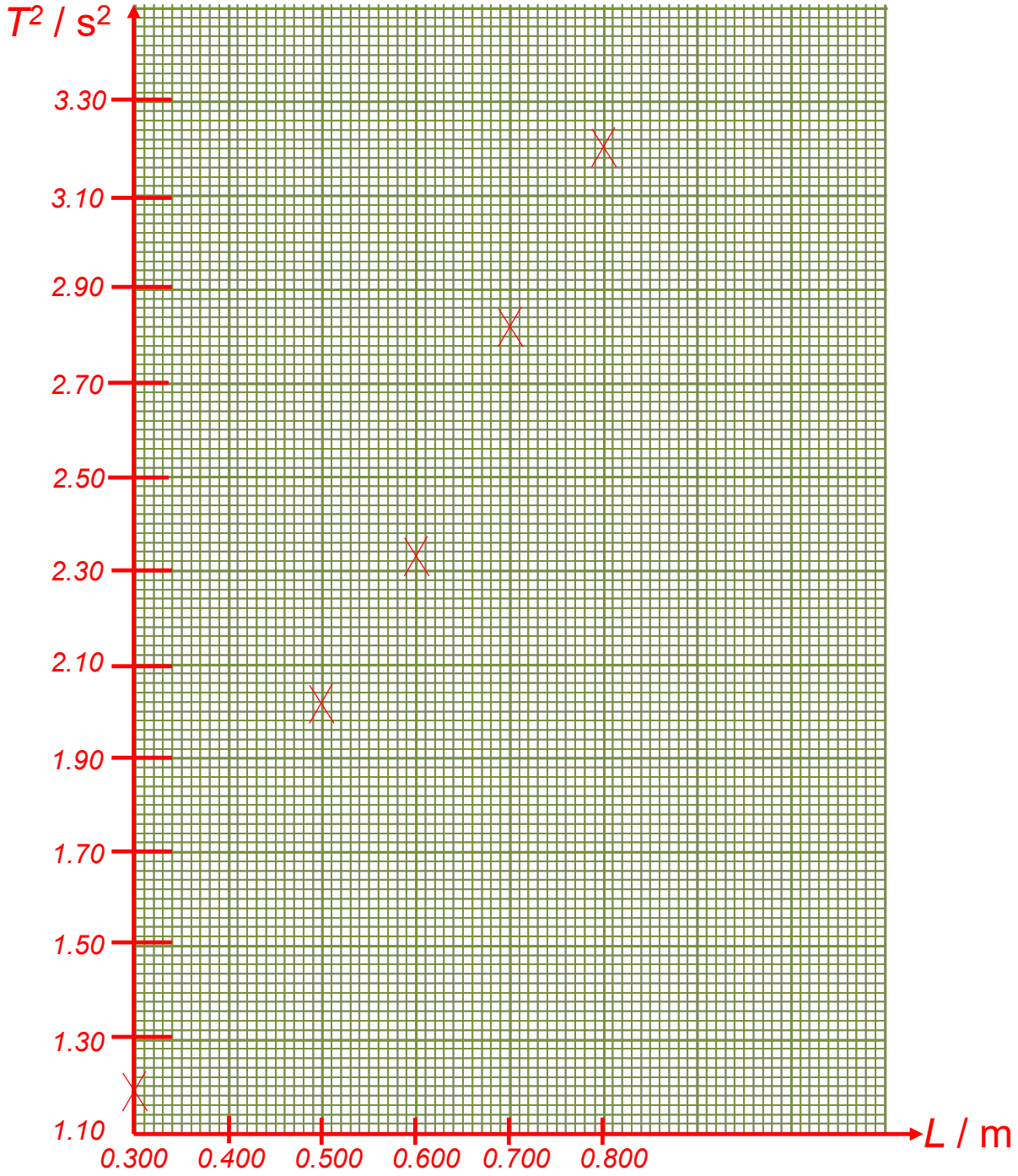
4: Label each interval on the graph i.e. each big square.

5: Plot the points correctly.



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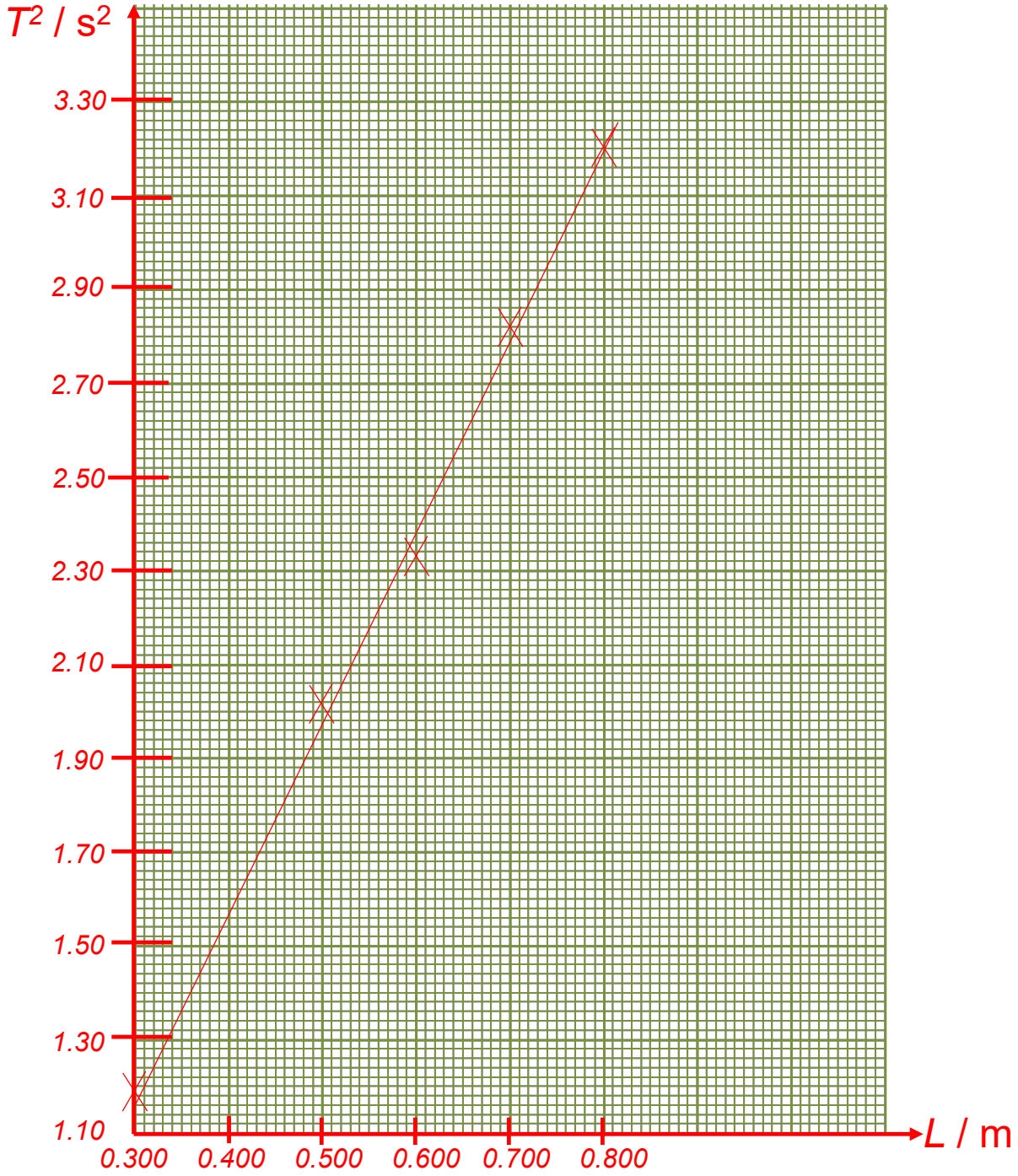
5: Plot the points correctly.

6: Draw the best fit line.

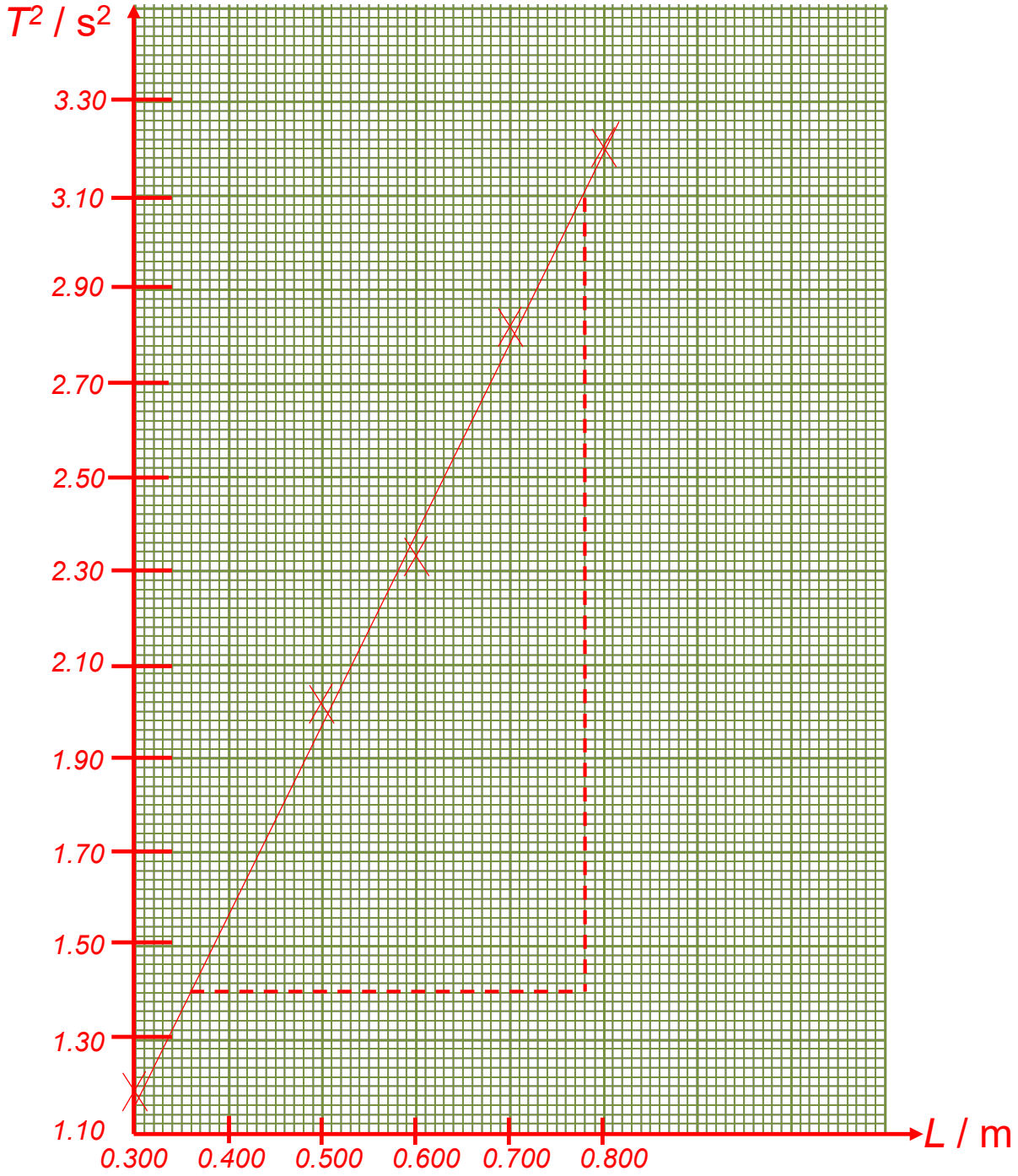


Gradient Calculation

Calculate the gradient of the graph. Show your working clearly.

1: Find two coordinates within the plotted points as far apart as possible.

2: Link the two points using dotted lines to form a dotted triangle.



Calculate the gradient of the graph. Show your working clearly.

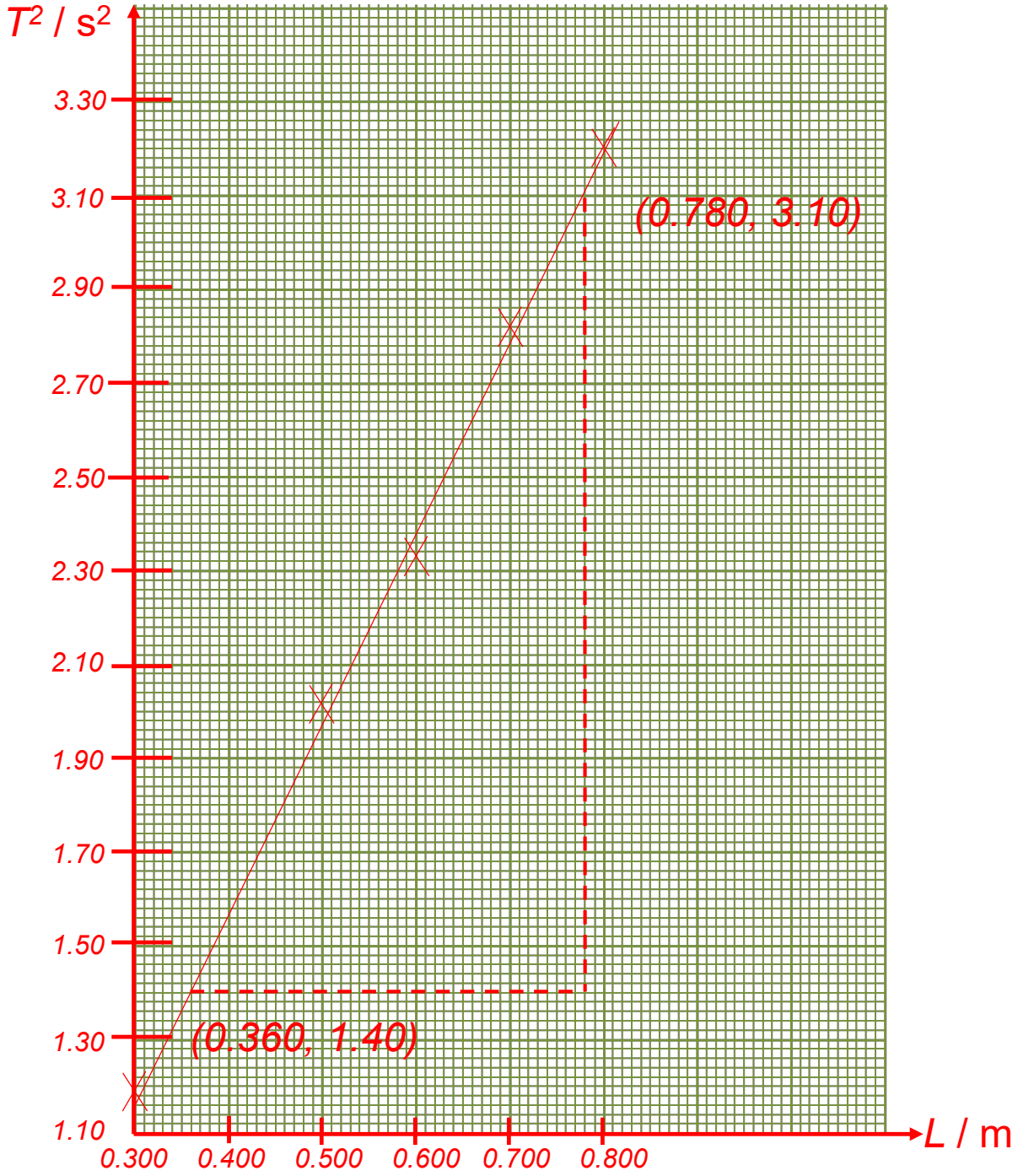
1: Find two coordinates within the plotted points as far apart as possible.

2: Link the two points using dotted lines to form a dotted triangle.

3. Label the coordinates chosen on the graph.
Number of decimal places for the coordinates is to the precision of half a small square on each axis.

x-coordinate is to 3 decimal place because half the smallest square interval is 0.005.
How to calculate:
1 big square has an interval of 0.1 m.
1 big square is made of 10 small squares.
1 small square thus has an interval of 0.1 / 10 = 0.01 m
½ small square will then has an interval of 0.01 / 2 = 0.005 m (3 d.p.)

y-coordinate is to 2 decimal place because half the smallest square interval is 0.01.
How to calculate:
1 big square has an interval of 0.2 s^2.
1 big square is made of 10 small squares.
1 small square thus has an interval of 0.2 / 10 = 0.02 s^2
½ small square will then has an interval of 0.02 / 2 = 0.01 s^2 (2 d.p.)



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x-coordinate is to 3 decimal place because half the smallest square interval is 0.005.

y-coordinate is to 2 decimal place because half the smallest square interval is 0.01.

4: Calculate the gradient.

Gradient = (3.10 – 1.40) / (0.780 – 0.360) = 4.05 s^2 / m

Note 1: Need to show working (working to follow the coordinates chosen)

Note 2: Answers to 3 sf

Note 3: Have to include unit of gradient where applicable