Gr:	***Last Name :***	
	First Name :	
	N°	

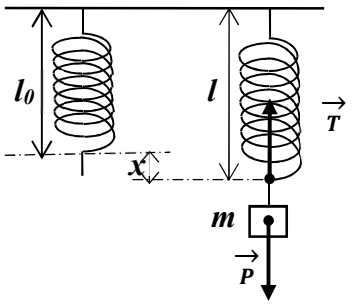
TP N°1 – Measurements and Uncertainties

Determination of the stiffness constant K of a spring

1- The length of the spring when empty is $l_o = 100\ mm$.

2- Measurement of the new length l of the spring. Deduce the elongation x of the spring. Then we deduce the average value of x and its uncertainty δx as a function of the mass m.

The systematic error of the rule used is: $\delta x_{sys} = 1\ mm$



m (kg)	0,2		0,3		0,4		0,6		0,7	
x (10^{-2}m)										
$\overline{x}$ ( )										
δx ( )										

Table 01

Calculation procedure:

$\overline{x}$ =.....

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δx = ...

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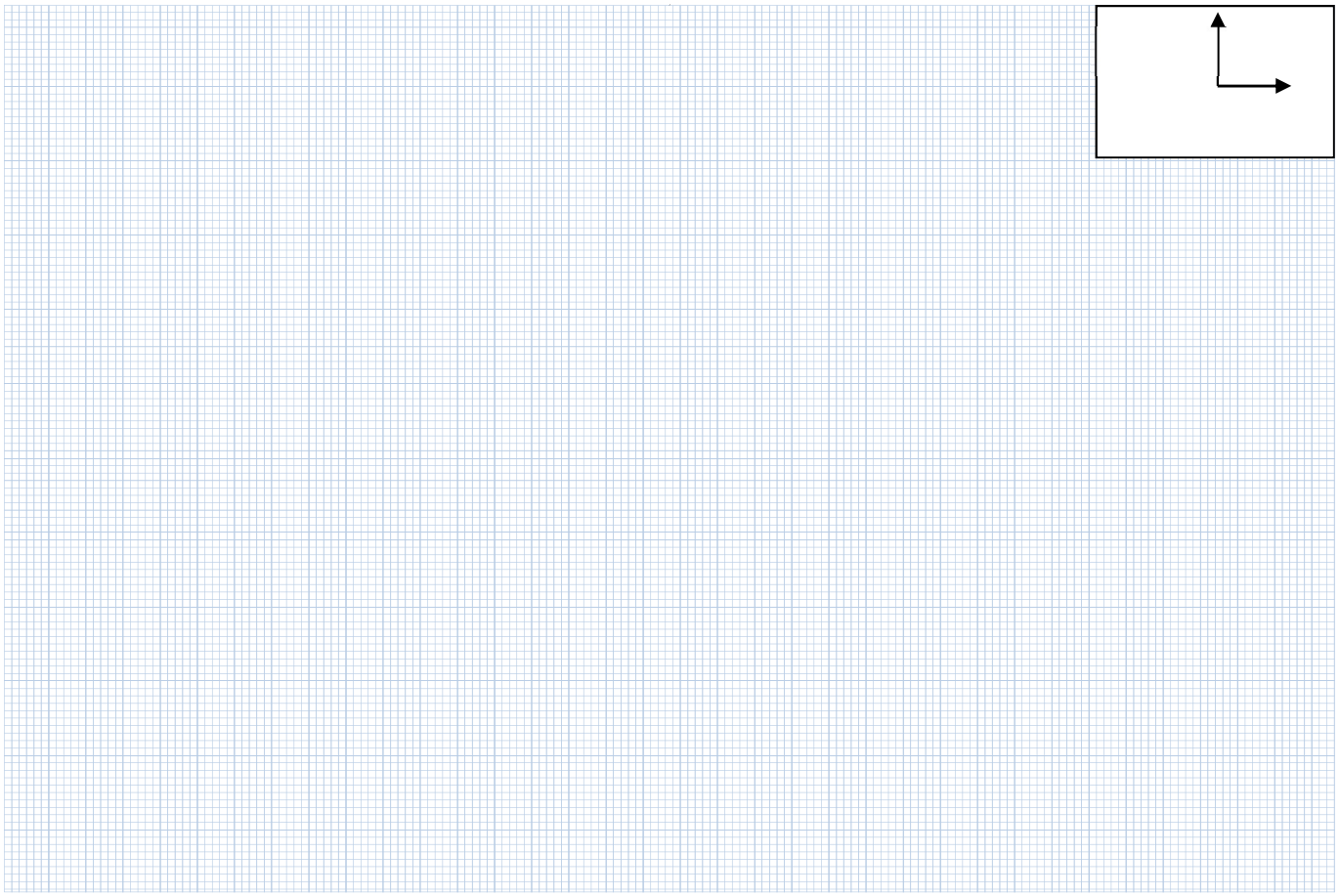
3- Plot the graphs representing the variation of **x** as a function of ***m*** (***x= f(m)***).



4- On the graph, indicate the maximum slope (p_{emax}) and the minimum slope (p_{emin}), and then deduce the average value ($\overline{p}_e$) of the slope as well as its uncertainty δp_e.

	Graph
The maximum slope p_{emax}	
The minimum slope p_{emin}	
The average value $\overline{p}_e$	
The uncertainty δp_e	

Table 02

5- Present the calculation procedure.

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6- Theoretical demonstration of the formula $p_e = g/K$;

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7-The stiffness constant K of the spring.

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8- Express the uncertainty δK as a function of δp_e et δg, using an uncertainty calculation through the logarithmic method.

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9- Present the final result correctly (i.e., $K = \overline{K} \pm \delta K$).

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10- Conclusion

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