I. In a beam (length \( l \)) the following bending moment was measured as function of coordinate \( x \): 
\[
M(x) = M_0 e^{x/l}
\].
Determine the support reactions at both ends of the beam! Is a line load acting on the beam? If so, determine the line load!

II. Determine the torsional stiffness of a helical spring with the following parameters: material of the wire is steel, diameter of the wire 1 mm, diameter of the coil 1 cm, number of turns: 10.
Note: Think of the beam equation in the form 
\[
M = -EI \frac{d\theta(s)}{ds}
\].

III. Prove that for the shown curved elastic rod the following equation applies:
\[
\frac{d^2 \theta}{ds^2} = -\frac{F}{EI} \sin \theta
\].

IV. Determine the deflection of a bimetallic plate (aluminum-copper) due to increase in temperature of 50°.
Material data: \( E_{Al} = 70 \text{GPa}, \ E_{Cu} = 120 \text{GPa}, \ \alpha_{Al} = 23 \cdot 10^{-5}/\text{K}, \ \alpha_{Cu} = 16 \cdot 10^{-5}/\text{K} \).
First try to solve a simplified task by assuming that the two elastic moduli are both equal to 100 GPa.

V. Determine the bending stiffness of a beam consisting of three plates with elastic moduli \( E_1, E_2, E_3 \).

Cross-section: