Problem 1

For the beam shown below, determine the displacement of right side and left side of the shear joint b, with the use of
a) Direct Integral Method.
b) Moment Area Method.

$I_{ab} = I = 4000 \text{cm}^4$, $I_{bc} = 2I$, $E = 2 \times 10^6 \text{Kg/cm}^2$, $L = 0.5 \text{m}$, $P = 1 \text{ton}$

Problem 2

For the beam shown below, determine the displacement of point c, with the use of
a) Direct Integral Method.
b) Moment Area Method.

$I = \text{cte} = 7.8 \times 10^8 \text{ mm}^4$, $E = 2 \times 10^6 \text{ Kg/cm}^2$, $P = 54 \text{KN}$, $K = \text{spring stiffness}$
Problem 3

For the frame shown below, determine the displacement (two translational) and rotation of point \( c \), with the use of
a) Direct Integral Method.
b) Moment Area Method.

\[ I = 4500 \text{ cm}^4, \quad E = 2 \times 10^6 \text{ Kg/cm}^2, \quad L = 1.2 \text{ m}, \quad P = 1 \text{ ton} \]

Problem 4

For the frame shown below, determine the displacement of point \( D \) and rotations of point \( C \) and point \( B \) with the use of Moment Area Method.

\[ EI = 10^7 \text{ N/m}^2 \]
Problem 5

For the beam shown below, determine the maximum displacement and the corresponding location along the beam (in terms of EI) with the use of Direct Integral Method.
(Hint: Solve each section of the beam separately for more convenience.)

**Problem 6**

For the beam shown below, determine the displacement of the torsional spring with the use of Direct Integral Method.

\[ EI = 10^6 \text{ N/m}^2, \quad K\theta = 2EI \]
Problem 7

For the beam shown below, determine the maximum displacement with the use of
a) Direct Integral Method.
  b) Moment Area Method.

\( EI = 10^6 \text{ N/m}^2 \)