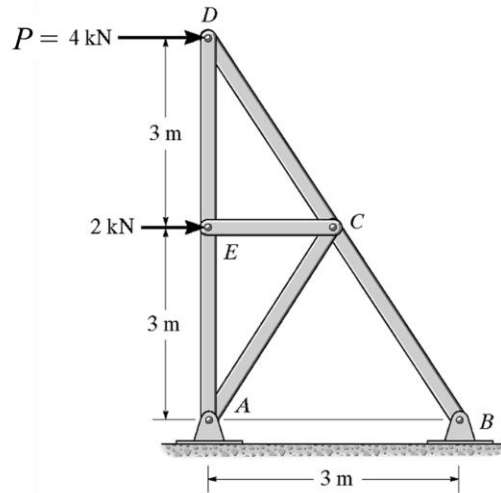


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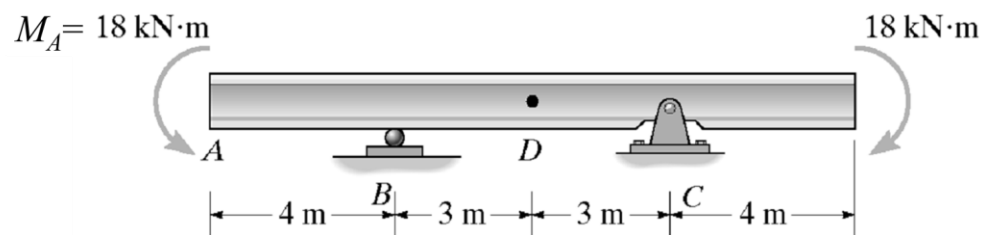
Student ID:

M28: Castigliano's Theorem

1. Determine the horizontal displacement of point D using Castigliano's theorem. Each steel member has a cross sectional area of 300 mm^2 . $E_{st} = 200 \text{ GPa}$.



2. The steel beam has a moment of inertia of $I = 125(10^6) \text{ mm}^4$. Determine the slope at A using Castigliano's theorem. $E_{st} = 200 \text{ GPa}$.

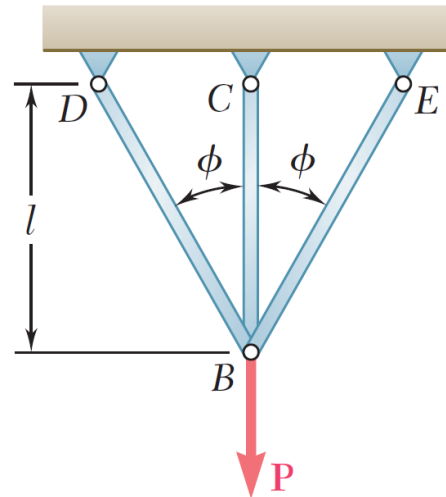


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M28: Castigliano's Theorem

3. Three members of the same material and same cross sectional area are used to support the load P . Determine the force in member BC using Castigliano's theorem.



4. The beam is supported by a pin at A , a spring having a stiffness k at B , and a roller at C . Determine the force the spring exerts on the beam using Castigliano's theorem. EI is constant.

