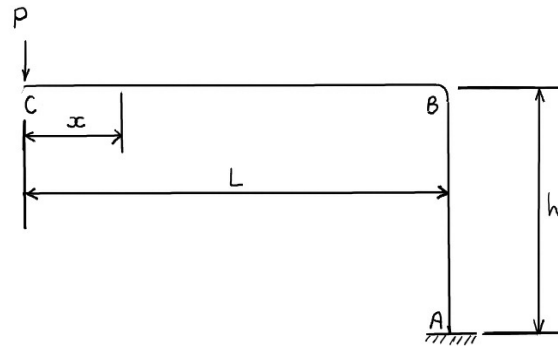


MCG 3131 - Assignment 1

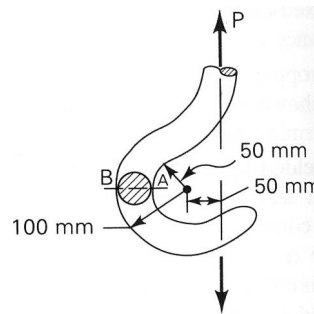
Problem 1

Consider the 90° bent cantilever beam shown in the figure below. The beam has constant properties E , I , and A . Assume elastic deflections and negligible deflection due to transverse shear. Determine the rotation (careful, not deflection) at point C due to load P using Castigliano's theorem.



Problem 2

For the hook of circular cross section shown in the figure below, (a) determine the maximum load P that may be supported without exceeding a stress of 161 MPa at point A ; (b) determine the stress at point B in section $A - B$ for the load obtained in (a).



Problem 3

A 50-mm diameter ball is pressed against a flat surface by a force of 500 N. The material is steel for both ($E = 200$ GPa, $\nu = 0.3$). Determine (a) the radius of the contact area; (b) the maximum contact pressure. Same questions when the ball is pressed against an identical ball.