Problem Set 2

Distributed: Wednesday, September 20, 2006
Due: Wednesday, September 27, 2006

Problem 1 (Based on Crandall, Dahl and Lardner 1.37):
A circular cylinder A rests on top of two half-circular cylinders B and C, all having the same
radius r. The weight of A is W, and that of B and C is W/2 each. Assume that the coefficient
of friction between the flat surfaces of the half-cylinders and the horizontal table top is μ_s.
Determine the maximum distance d between the centers of the half cylinders to maintain equilibrium.
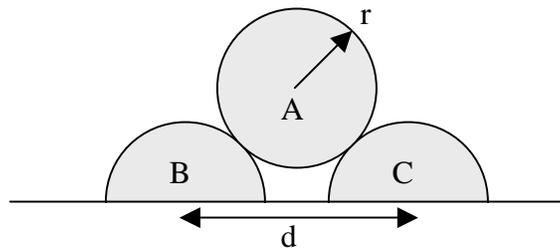
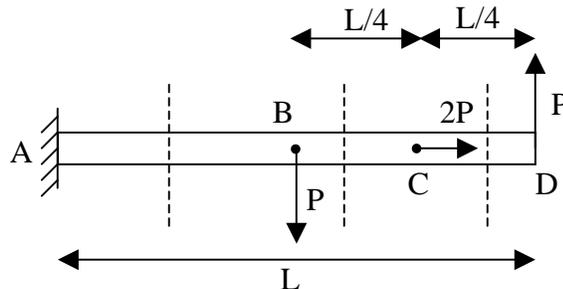Problem 2: For the beam shown below, find the internal forces and moments as a
function of length x along the beam at the points indicated by the dotted lines. Plot your
results as a function of x, and explain why your results make sense.
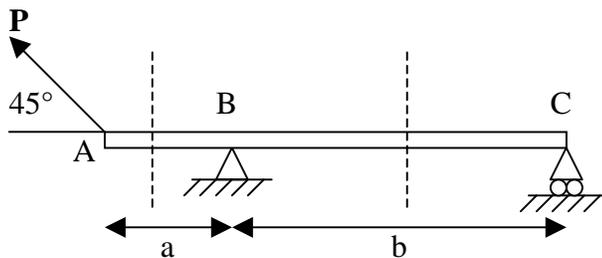
Problem 3: For the beam shown below, find the internal forces and moments as a function of length x along the beam at the points indicated by the dotted lines. Plot your results as a function of x, and explain why your results make sense.
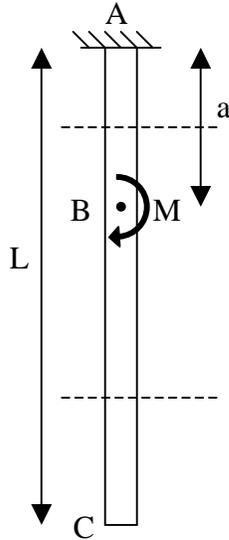
Problem 4: For the beam shown below, find the internal forces and moments as a function of x at the points indicated by the dotted lines. For the "cut" between points C and D, calculate the internal forces and moments in two ways. First use the left piece of the beam, and then use the right piece of the beam. Plot your results as a function of length x along the beam, and explain why your results make sense.

Problem 5: Find the internal forces and moments as a function of x at the points indicated by the dotted lines in the bar AD shown below. Plot your results vs length along AD, and explain why they make sense.