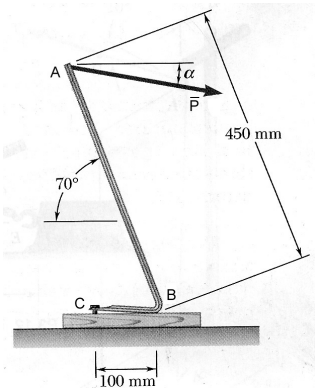
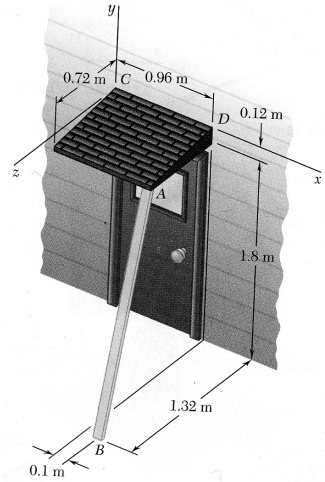
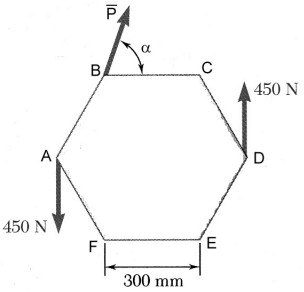
ES201 Problem set #2



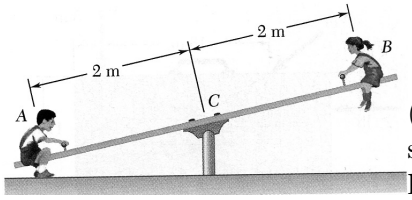
(1) The nail at C requires an 800 N pull to be extracted. At the point of pulling, determine (a) the moment about B of the force exerted on the nail, (b) the magnitude of the force $\overline{\mathsf{P}}$ which creates the same moment about B if α=10°, (c) the smallest magnitude for $\overline{\mathsf{P}}$ which creates the same moment about B.



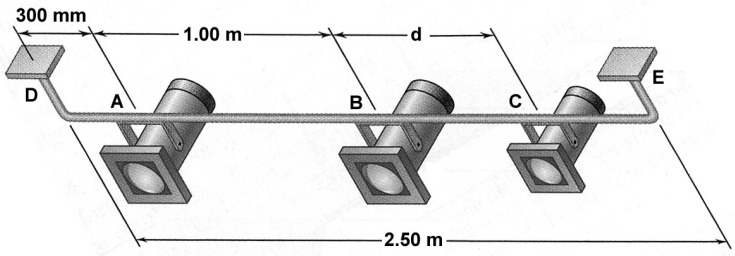
(2) The beam AB used as a prop to support the roof shown exerts a force of 228 N on point A, directed along the direction BA. Determine (a) the moment about C of that force; (b) the moment about D of that force.



(3) The hexagonal plate ABCDEF is acted upon by the force $\overline{\mathsf{P}}$ and the couple shown. Determine the magnitude and direction of the smallest force $\overline{\mathsf{P}}$ for which this system can be replaced with a single force at E.



(4) The masses of the kids at A and B are 38 kg and 29 kg, respectively. Where should a third sit in order to keep the center of mass of all three above C if they have a mass (a) of 27 kg, (b) of 24 kg?



(5) Three stage lights are mounted on a pipe as shown m_A=m_B=1.8 kg, and m_C==1.6 kg. If d=75cm, determine the distance from D to the center of mass of the three lights. (b) Determine the value of d so that the center of mass of the lights passes through the midpoint of the pipe.