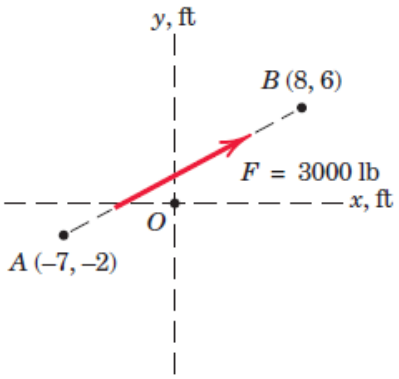
Indian Institute of Technology Jodhpur
NH 65, Surpura Bypass Rd, Karwar, Rajasthan 342037

Course: Engineering Mechanics **Code: MEL1010**

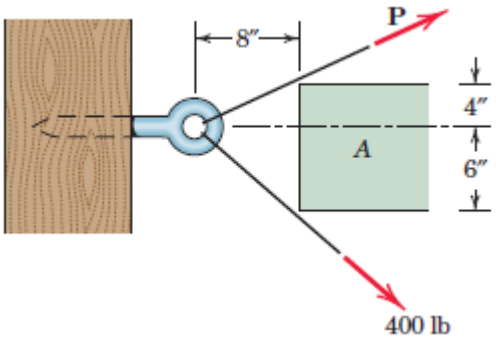
Date: 15/12/2021 **Tutorial: 1**

Question 1: Determine the percent error n in replacing the sine and the tangent of an angle by the value of the angle in radians for angle values of 5°, 10°, and 20°. Explain the qualitative difference between the sine and tangent results.

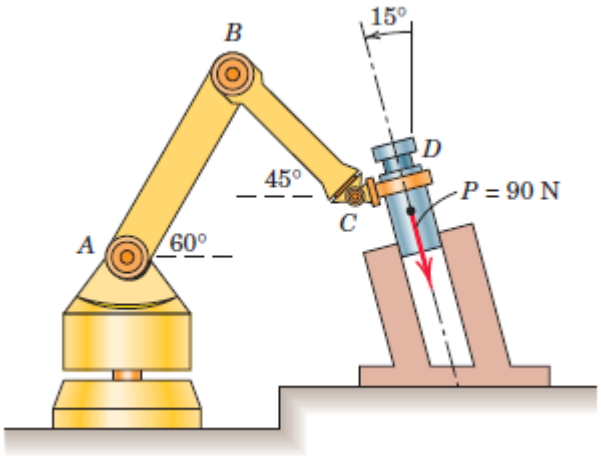
Question 2: The line of action of the 3000-lb force runs through the points *A* and *B* as shown in the figure. Determine the *x* and *y* scalar components of **F**.



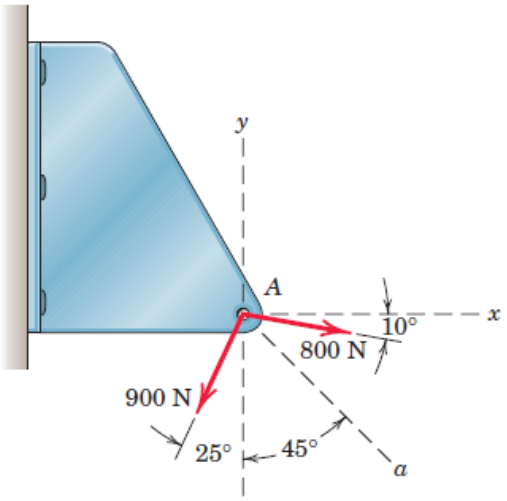
Question 3: It is desired to remove the spike from the timber by applying force along its horizontal axis. An obstruction A prevents direct access, so that two forces, one 400 lb and the other P, are applied by cables as shown. Compute the magnitude of P necessary to ensure a resultant T directed along the spike. Also find T.



Question 4: In the design of the robot to insert the small cylindrical part into a close-fitting circular hole, the robot arm must exert a 90-N force P on the part parallel to the axis of the hole as shown. Determine the components of the force which the part exerts on the robot along axes (a) parallel and perpendicular to the arm AB, and (b) parallel and perpendicular to the arm BC.



Question 5: The gusset plate is subjected to the two forces shown. Replace them by two equivalent forces, Fx in the x-direction and Fa in the a-direction. Determine the magnitudes of Fx and Fa.



Question 6: Read and explore the history of History of measurement systems in India.