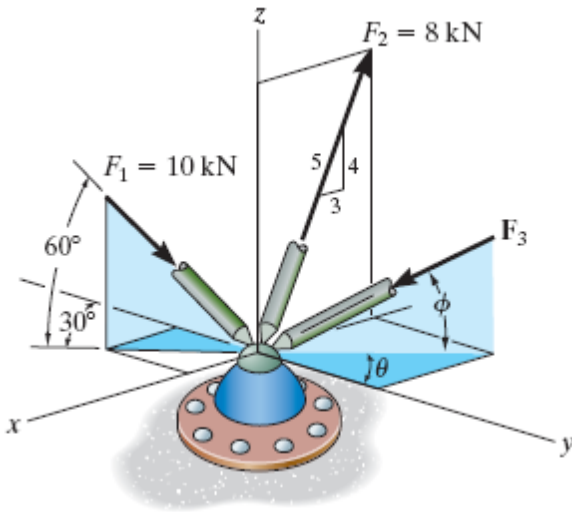


2.5 hour exam. Closed book.

Please **print out** this mock midterm and come to one of the PASS workshops after **attempting the questions at home**. Solutions will not be posted online. Be ready to participate.

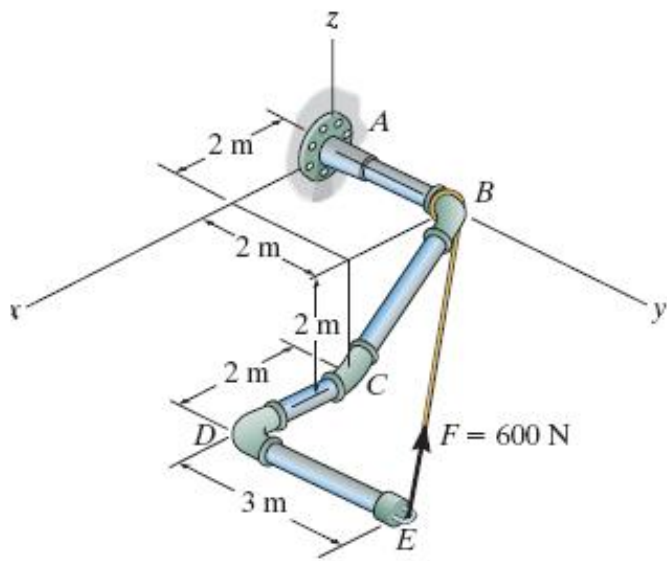
Problem 1

If $F_3 = 9$ kN, $\theta = 30^\circ$, and $\phi = 45^\circ$, determine the magnitude and coordinate direction angles of the resultant force acting on the ball-and-socket joint.



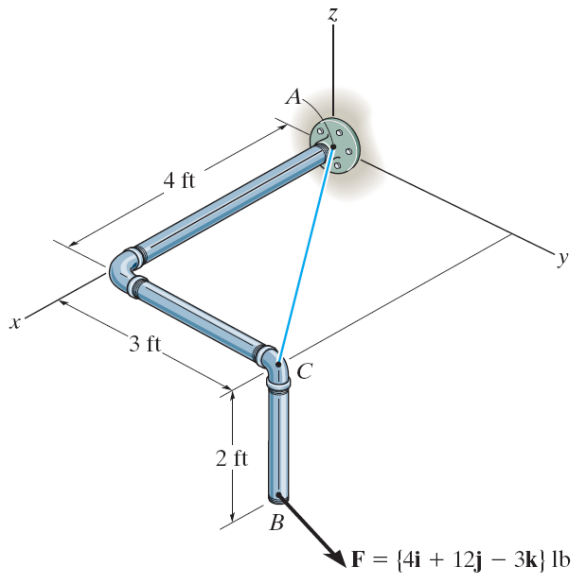
Problem 2

Determine the magnitudes of the components of $\mathbf{F} = 600\text{ N}$ acting along and perpendicular to segment DE of the pipe assembly.



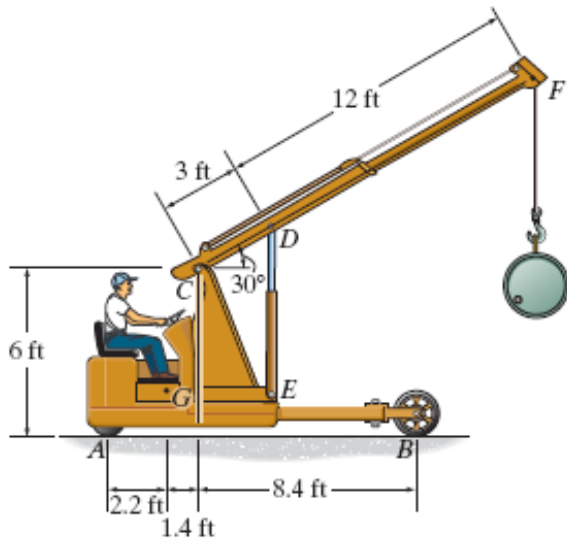
Problem 3

Determine the moment of the force \mathbf{F} about an axis extending between A and C. Express the result as a Cartesian vector.



Problem 4

The floor crane and the driver have a total weight of 2500 lb with a centre of gravity at G . If the crane is required to lift the 500-lb drum, determine the normal reaction on both the wheels at A and both the wheels at B when the boom is in the position shown.



Problem 5

Replace the force and couple moment system acting on the overhang beam by a resultant force, and specify its location along AB measured from point A.

