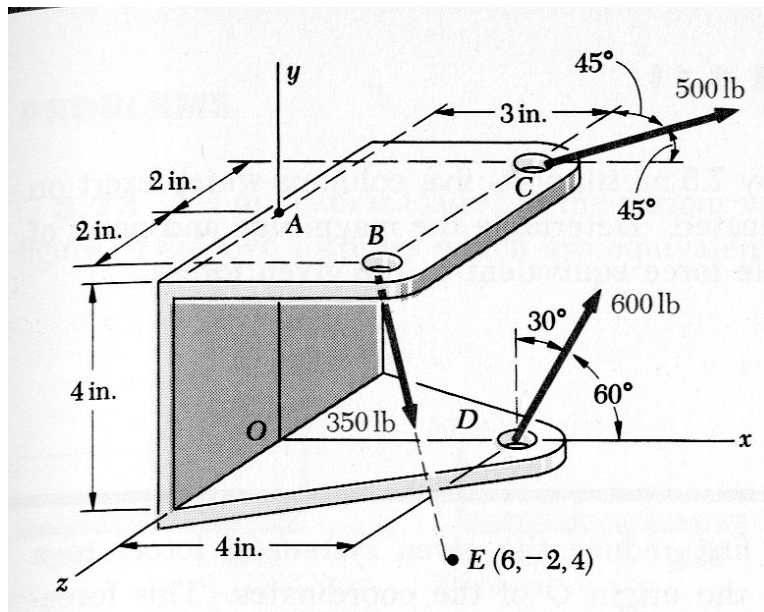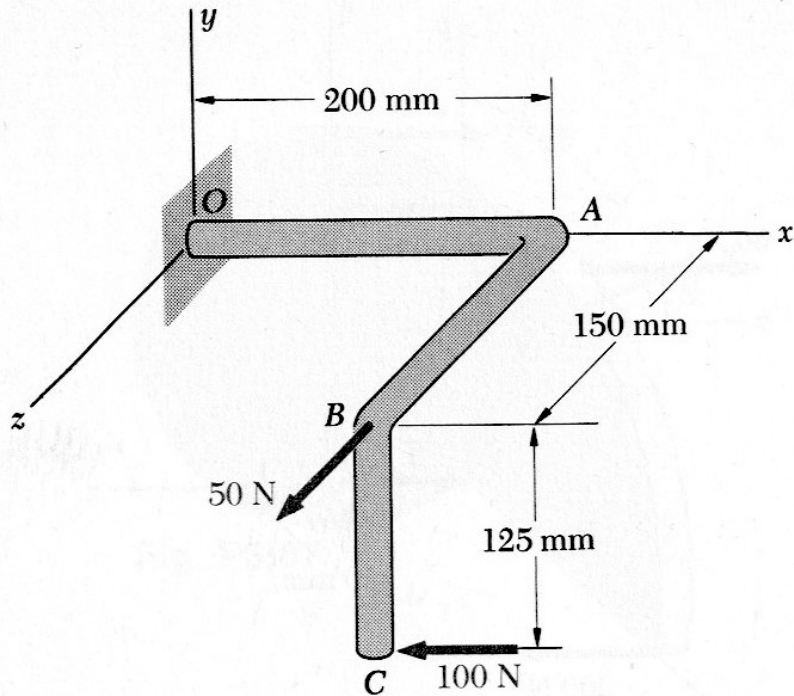1. (25 pts) The crate has a weight of 300 N. It is held in place on the smooth surface by the force **P** (parallel to the z-axis) and the force in the cable AB. Determine the magnitude of **P** and the tension in cable AB.

2. (25 pts) Replace the forces shown by a force/couple system acting at A (this is not a screwdriver problem).

3. (25 pts) Reduce the forces shown to their simplest resultant. If a single force, give the placement of the line of the force. If a screwdriver, give the placement of the line of the screwdriver. Change all the distances to meters to make the numbers more manageable.
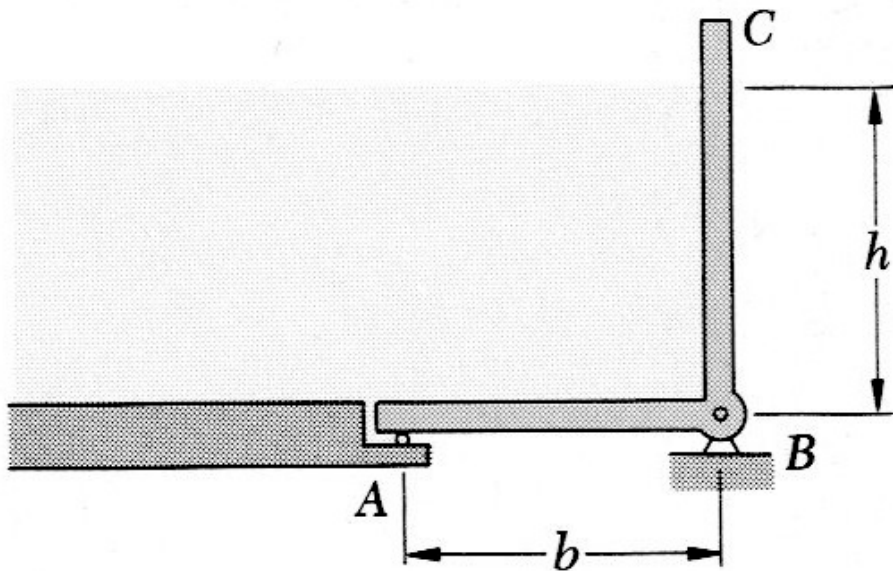
4. (25 pts) The water gate shown is 3 ft wide (into the page, but you don't need the number) and consists of an angled steel plate hinged at B. Find the ratio $\frac{h}{b}$ at which the reaction force at A becomes zero (and therefore the gate opens). Ignore the weight of the steel plates. You don't need it, but the weight density of water (ρg) is 62.4 lb/ft^3. The increase in pressure with depth d in a fluid is $\rho g d$. A fluid exerts a pressure force on every boundary it touches.