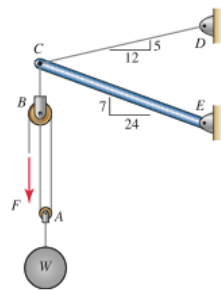
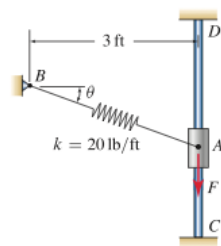


The hoist shown is used in a machine shop to position heavy workpieces in a lathe. If the cable between pulleys A and B can support a force of 300 lb, all other cables can support a force of 500 lb, and bar CE can support a compressive force of 600 lb, determine the largest weight W that may be lifted.

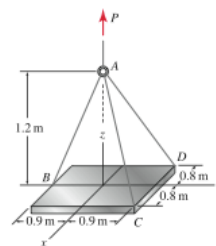


Collar A has negligible weight and slides without friction on the vertical bar CD . Determine the vertical force F that will produce $\theta = 30^\circ$ if

- Spring AB is unstretched when $\theta = 0^\circ$.
- Spring AB has an unstretched length of 2 ft.
- Spring AB has an unstretched length of 4 ft.

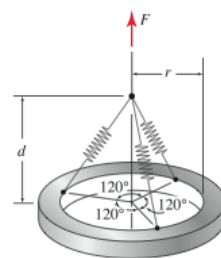


When in equilibrium, plate BCD is horizontal. If the plate weighs 1.6 kN, determine the forces in cables AB , AC , and AD .



A circular ring with weight W and inside radius r is supported by three identical springs having stiffness k and which that unstretched when $d = 0$. When in equilibrium, the ring is horizontal.

- Derive an expression that relates the weight W to d and r .
- If $W = 300$ lb, $k = 25$ lb/in., and $r = 20$ in., determine d (an accurate approximate solution is acceptable).



Member OA buckles when the compressive force it supports reaches 400 N. Cables AC and AD each have 300 N breaking strength. Assuming the cabling between A and B is sufficiently strong, determine the force T that will cause the structure to fail. Assume the pulleys are frictionless with diameters that are small enough so that all cables between A and B are parallel to line AB .

