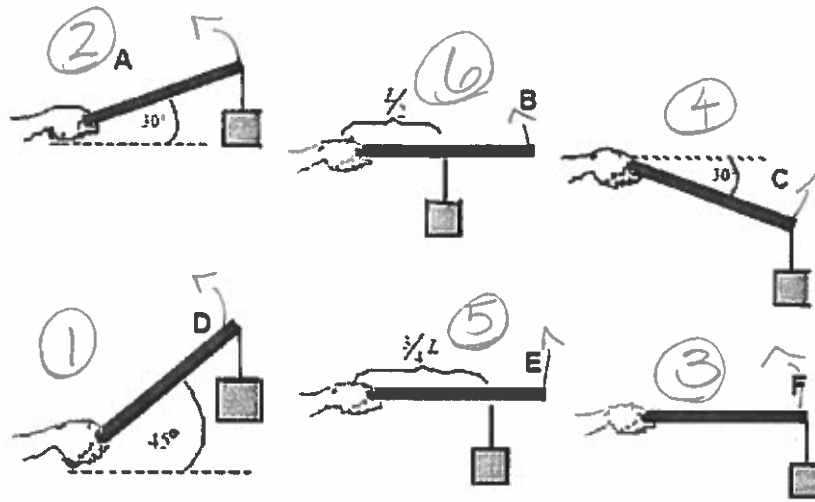
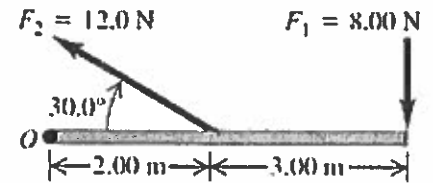


8. A box is attached via a rope to a rod at different angles as in the different scenarios below. The box mass, rod mass, and rod length are constant in each scenario. Rank the following situations from least to greatest amount of torque required for the hand to turn the rod in the counterclockwise direction.



9. Two forces,  $F_1$  and  $F_2$ , act on a beam that has a pivot located about its left end, as in the diagram below.

- Calculate the amount of torque exerted on the beam by  $F_1$  and  $F_2$ .
- Determine the net torque acting on the beam (counterclockwise direction is positive).

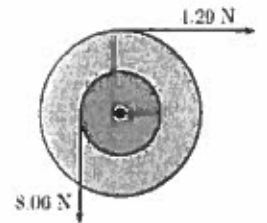


$$a) \tau_1 = 8.00 (5.00) = 40 \text{ N}\cdot\text{m}$$

$$\tau_2 = 12.0 (2.0) (\sin 30^\circ) = 12 \text{ N}\cdot\text{m}$$

$$b) 40 - 12 = \boxed{28 \text{ N}\cdot\text{m}}$$

10. A compound pulley consists of a large wheel attached to a smaller wheel at the center. The smaller wheel has a radius of 1.1 m and experiences a force of 8.06 N while the larger wheel has a radius of 2.5 m and experiences a force of 4.29 N, as in the diagram. Determine the net torque acting on the pulley.



$$(8.06)(1.1) - (4.29)(2.5)$$

$$8.866 - 10.725 =$$

$$10.725 \text{ N}\cdot\text{m} = 19.591$$