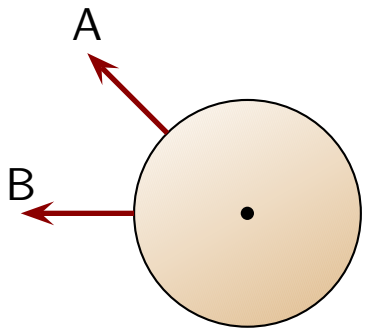
Question 1

A disk can rotate about its center. A rope attached to the rim pulls directly outward. Two possibilities are illustrated.



Which of the following represents the angle that should be used in $\tau = rF\sin\phi$ when calculating the torque about the center?

1. $\phi_A = 0^\circ \qquad \phi_B = 0^\circ$
2. $\phi_A = 45^\circ \qquad \phi_B = 0^\circ$
3. $\phi_A = 45^\circ \qquad \phi_B = 180^\circ$
4. $\phi_A = 135^\circ \qquad \phi_B = 0^\circ$
5. $\phi_A = 135^\circ \qquad \phi_B = 180^\circ$

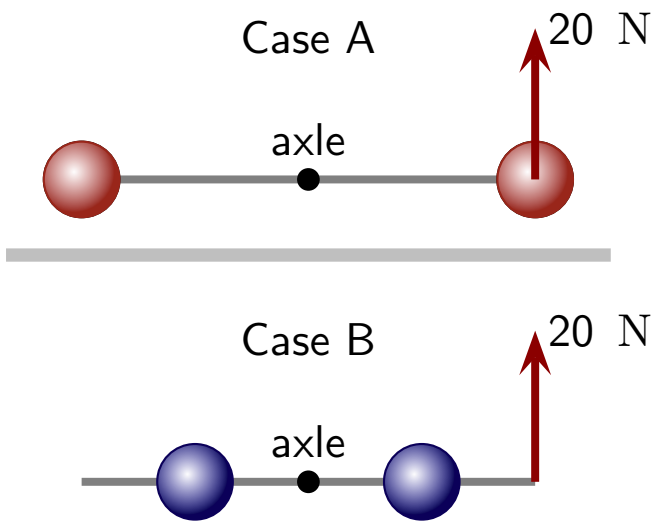
Warm Up Question 1

Two identical meter sticks rotate about different pivot points. For one the pivot point is in the center of the meter stick, for the other the pivot is at one end of the meter stick. How do the moments of inertia about the pivot compare (same, one is larger, one is smaller,...)? Explain your answer.

1. Larger when the pivot is at the end. Larger r in mr^2.
2. Smaller when the pivot is at the end.
3. Same in all cases.

Question 2

Rods with length $2.0\,\mathrm{m}$ rotate about an axle at their midpoints. Two such rods are set up with masses attached as illustrated.



The masses in both cases are the same. The same force acts at the end of each rod. Which of the following is true regarding the resulting angular acceleration?

1. $\alpha_A > \alpha_B$
2. $\alpha_A < \alpha_B$
3. $\alpha_A = \alpha_B \neq 0$
4. $\alpha_A = \alpha_B = 0$

Warm Up Question 2

A designer considers making bicycle wheels. One possible wheel is a narrow solid hoop with very light spokes. The other possibility is a solid disk of uniform thickness. Both wheels will have the same mass and the same radius. Suppose that the torque on each wheel (via the bicycle drive train) is the same. Which wheel, if any will have the larger angular acceleration? Explain your answer.

1. Same since the torque is the same.
2. Larger for solid wheel. Moment of inertia.
3. Larger for solid wheel. Mass closer to axle.
4. Larger for hoop/spoke wheel. Moment of inertia.
5. Larger for hoop/spoke wheel. Mass further from axle.