A uniform horizontal beam 5.00 m long and weighing $3.00 \times 10^2$ N is attached to a wall by a pin connection that allows the beam to rotate. Its far end is supported by a cable that makes an angle of $53.0^\circ$ with the horizontal. If a person weighing $6.00 \times 10^2$ N stands 1.50 m from the wall, find the magnitude of the tension in the cable and the force exerted by the wall.

1 Using a screwdriver, you try to remove a screw from a piece of furniture, but can't get it to turn. To increase the chances of success you should us a screwdriver that

A is longer  
B is shorter  
C has a narrower handle  
D has a wider handle
2. A constant net torque is applied to an object. Which one of the following will not be constant?

A. angular acceleration
B. angular velocity
C. moment of inertia
D. center of gravity

**Torque and Angular Acceleration**

\[ \tau = \sum F \times r = ma_t \]

\[ a = \frac{\tau}{mr^2} \]

\[ \omega = \frac{v}{r} \]
\[ I = \Sigma mr^2 \]

\[ I = M_1 r_1^2 + M_2 r_2^2 + M_3 r_3^2 + \ldots \]

\[ I = r^2 (M_1 + M_2 + M_3 + \ldots) \]

\[ I = Mr^2 \]
What is the Moment of Inertia for the object below?

\[ I = \sum_i m_i r_i^2 \]

\[ I = m_1 r_1^2 + m_2 r_2^2 + m_3 r_3^2 + m_4 r_4^2 \]

\[ I = r^2 \left( m_1 + m_2 + m_3 + m_4 \right) \]

\[ I = (0.50 \cos 45^\circ)^2 \]

\[ I = 0.125 \text{ kg m}^2 \]

3. Two rigid objects shown have the same mass, radius, and angular speed. If the same braking torque is applied to each, which takes longer to stop?

A. A
B. B
C. Have No Clue
A solid frictionless cylindrical reel of mass \( M = 3.00 \text{ kg} \) and radius \( R = 0.400 \text{ m} \) is used to draw water from a well. A bucket of mass \( m = 2.00 \text{ kg} \) is attached to a cord that is wrapped around the cylinder.

(a) Find the tension \( T \) in the cord and acceleration \( a \) of the bucket.

(b) If the bucket starts from rest at the top of the well and falls for 3.00 s before hitting the water, how far does it fall?