# Conceptual Exercises 7

1. Consider the situation shown below left. A puck of mass m, moving with speed v hits an identical puck that is fastened to a pivot using a string of length r. After the elastic collision, the puck attached to the string revolves around the pole. Suppose we now lengthen the string by a factor of 2, as shown on the right, and repeat the experiment. Compared to the angular speed in the first situation, the new angular speed is:
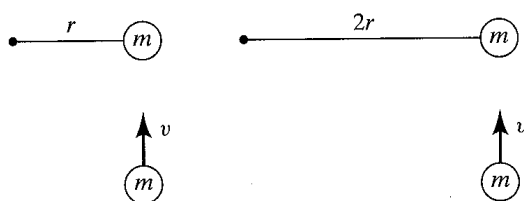
    a) Twice as high   b) The same   c) Half as much

2. Two wheels with fixed hubs, each having a mass of 1 kg, start from rest, and forces are applied as shown. Assume the hubs and spokes are massless, so that the rotational inertia is $I = mR^2$. In order to impart identical angular accelerations, how large must F_2 be?

    a) 1 N

    b) 2N

    c) 4N
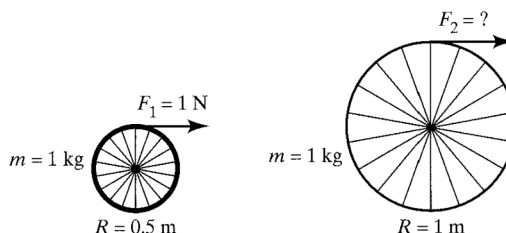
3. A figure skater stands on one spot of the ice and spins with her arms extended. When she pulls in her arms, her angular velocity changes. Compared to her original angular velocity, her new <u>angular velocity</u> is:
    a) Larger   b) Smaller   c) The same

4. A figure skater stands on one spot of the ice and spins with her arms extended. When she pulls in her arms, her kinetic energy changes. Compared to her original kinetic energy, her new <u>kinetic energy</u> is:
    a) Larger   b) Smaller   c) The same

5. Imagine the elastic collision of a ball of mass m and velocity v hitting a dumbbell . The ball can either strike the center of the dumbbell or strike the dumbbell on one end. Which case gives the dumbbell the greater center of mass velocity afterward?
    a) hitting the dumbbell center of mass
    b) hitting the end of the dumbbell
    c) the dumbbell center of mass velocity would be the same in the two cases