**IB Physics**

**FA8.3 - Rotational Energy and Momentum**

Name

Favorite Musician

**Show your work, and circle your answers and use sig figs to receive full credit.**

I (about centers): cylinder = 1/2mr2, ring/point = mr2, sphere = 2/5mr2, rod = 1/12mL2 (= 1/3mL2 about end)

**1-3: A 12.0 g, 0.0140 m radius marble rolls down an incline that is 3.80 m long, and loses 0.120 m of elevation.**

1. Set up the appropriate dynamics or conservation of energy equation, substitute for ω or α, and for I, and solve for v or a. Show your steps below. Give an exact answer.  

2. Solve for the final velocity of the marble at the bottom of the incline.

3. Calculate the acceleration of the marble as it rolls down the incline.

**4-5: A 45.0 kg child is 1.80 m from the center of a 2.00 m radius merry go round that is a 160. kg cylinder.**

4. If the merry go round speeds up from 1.40 rad/s to 2.10 rad/s in 4.00 seconds, what torque was applied?

5. If the merry go round is spinning at 45.0 RPM and the child moves from 1.80 m from the center to 0.600 m from the center, what is the new angular velocity of the merry go round in RPMs?