Name_____

Favorite Musician_____
Show your work, and circle your answers and use sig figs to receive full credit.
I (about centers): cylinder = $^1/_2mr^2$, ring/point = mr^2, sphere = $^2/_5mr^2$, rod = $^1/_{12}mL^2$ (= $^1/_3mL^2$ 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 <u>dynamics</u> or <u>conservation of energy</u> equation, substitute for <u>ω or α</u>, and for <u>I</u>, and solve for <u>v or a</u>. Show your steps below. Give an exact answer. $a = \dfrac{5}{7}g \bullet \sin(\theta)$ $v = \sqrt{\dfrac{10}{7}gh}$

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?