

## Physics 2301: Problem Set #2

These problems are due by upload to Carmen before class on Wednesday January 26.

1. Shankar BTM 8.2.1, 8.2.2 and 8.2.3 p. 213-4.
2. Morin 8.76 (Bouncing under a table) Do this one with a general value of  $\beta \equiv \frac{I_0}{mR^2}$ , and then evaluate at  $\beta = (2/3)$  in particular.
3. Morin 9.23 (Rolling coin)
4. Morin 9.39 (Striking another triangle)
5. Morin 9.41 (Circling stick again)
6. Morin 9.43 (Rotating sheet) By “look like” we mean “comment on the aspect ratio  $a/b$ .”
7. Morin 9.45 (Stick on a ring)
8. A uniform cylinder of mass  $m$ , radius  $R$  and length  $h$  rolls without slipping at a *constant* angle  $\phi$  relative to horizontal, and with the point of contact with the ground tracing out a circle of radius  $r$ . There is gravity  $g$  in the vertical direction. Write the torque equation, which determines the orbital frequency  $\Omega$ .
9. (BONUS) Morin 8.77 (Bouncing under a table again)