Homework 4
Due Friday, September 23rd at 5pm
in 251 LeConte

Finish reading the body of Chapter 7 in Taylor's Classical Mechanics. Also read the optional sections 7.8 and 7.10. We will be discussing these sections in lecture over the course of next week.

1. Taylor 6.25, p234

2. Taylor 7.8, p282

3. Taylor 7.11, p282

4. Taylor 7.14, p283

5. Taylor 7.24 & 7.27, p285

6. Taylor 7.30, p286

7. Taylor 7.41, pp288 & 289

Optional: If you didn't already think about this last week, now's a great time. The reason I include it is that it has a nice connection with the oscillations material you've been thinking about. A regular pendulum makes a very good clock (this was Galileo's astonishing insight) but it doesn't make a perfect one. (Why not? Hint: There are multiple reasons.) But by thinking about the results of Taylor 6.25, Huygens concocted a brilliant pendulum that is theoretically a perfect clock! Can you think of a way to construct such a pendulum? [Hint: It's a bit like your homework problem with the pendulum wrapped around the cylinder. You want to change how the pendulum swings.] Unfotunately, Huygens' idea isn't practical; it turns out that there is too much friction and it ends up being a worse clock in practice then the good old pendulum bob.