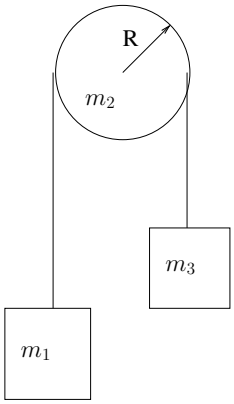
Physics 209: Problem Set 9
Due Date: Nov 4, 2014

1. In the diagram below $m_1 = 20$ kg, $m_2 = 25$ kg, $m_3 = 25$ kg, and $R = 1$ m. Using energy conservation, how fast is m_2 moving if it falls 2 m from its initial position?



2. What is the the angular acceleration on the disk for the above situation?

3. (20 pts) Consider a solid cylinder rolling down an incline plane with a 45 degree angle to the horizon. If the cylinder has a mass of 1 kg and a radius of 0.1 m, what is the force of friction on the cylinder if it rolls without slipping?

4. (20 pts) TM Chap 9, prob 100

5. (20 pts) Calculate the following cross product $\vec{A} \times \vec{B} = \vec{C}$ for the following $\vec{A}$ and $\vec{B}$:
   (a) $\vec{A} = 4\hat{i} + 3\hat{j}$, $\vec{B} = 5\hat{k}$
   (b) $\vec{A} = 2\hat{i} + 3\hat{j} - 4\hat{k}$, $\vec{B} = 2\hat{i} + 6\hat{j} - 8\hat{k}$
   (c) $\vec{A} = 1\hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{B} = 4\hat{i} + 5\hat{j} - 6\hat{k}$