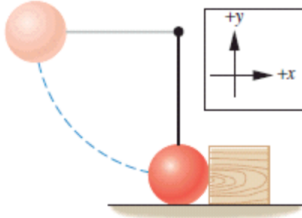


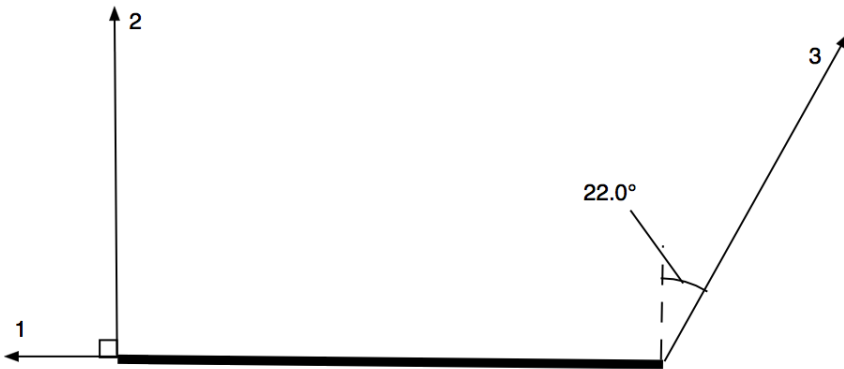
Physics 10154 - Exam #3B

Points will be deducted if you don't show your work (or if some parts are incorrect) even if you get the right answer. Clearly indicate your answer with a circle or box and remember to include correct units and significant figures.

1. (30 pts) A 1.50-kg ball is attached to the ceiling by a light string of length 85.0 cm, which is initially horizontal and released from rest. It swings down and strikes the 2.00-kg block initially at rest in an elastic collision.
- a) After the collision, the ball (still attached to the string) reaches what maximum height about the surface?
- b) The coefficient of kinetic friction between the block and surface is 0.290. How far does the block slide on the horizontal surface after the collision before stopping?



2. (35 pts) A 925-N hiker is crossing a small horizontal bridge. The bridge is uniform and weighs 4210 N. The bridge has 3 numbered supporting ropes, as shown. The hiker stops $1/4$ of the way from the left end of the bridge. What is the magnitude of the force that each rope exerts on the bridge? Answer with 3 SF.



3. (35 pts) A 3.50-kg mass is attached to one end of a horizontal spring ($k = 1240 \text{ N/m}$) while the other end of the spring is fixed in place.
- a) If the coefficient of static friction between the block and surface is 0.550, what is the maximum length to which the spring can be compressed for which the mass will not move in response to the spring force?
 - b) Suppose the spring is compressed a distance 25.0% larger than your answer to (a) and released. If the coefficient of kinetic friction between the block and surface is 0.115, how fast is the block moving when it passes through equilibrium?