## Physics 116 Sample Exam Question

1. You are standing at Merrill Beach, 12.0 m directly over the first-floor entrance to the building. You see a friend, who is 1.5 meters tall, approaching the building at a constant speed of 1.30 m/s. After doing a quick calculation to figure out when to release the snowball, you drop it and it hits her squarely on the top of her head. (35 pts.)

12.0 m

1.5 m
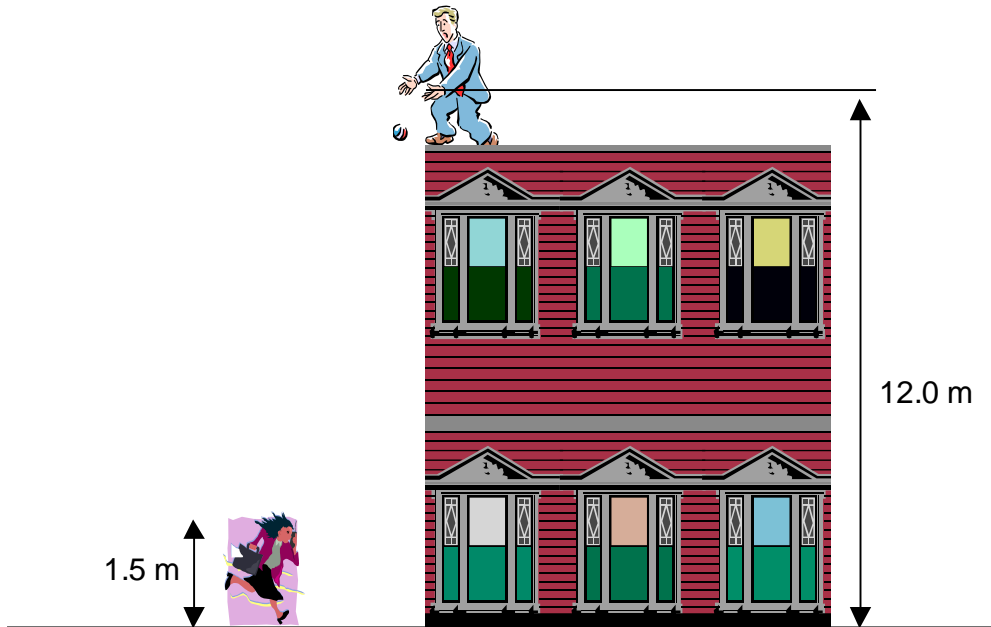
   a) After suitably defining your coordinates, sketch the motion of the snowball. Provide graphs of position vs. time, velocity vs. time and acceleration vs. time. (10 pts.)
   b) Explain how it is in general possible for acceleration to have opposite sign as velocity. Does that situation occur in this case? If so, explain how it does. If not, how would you modify the above scenario so that it does occur. (10 pts.)
   c) How far is your friend from the building's entrance when you release the snowball? How long is the snowball in the air? (15 pts.)