DO NOT TURN THIS PAGE!!!!!

Name: _____

Physics 50
Fall 2016
Exam 1

MAKE SURE TO SHOW ALL WORK IN COMPLETE DETAIL. NO CREDIT WILL BE GIVEN IF NO WORK IS SHOWN. EXPRESS ALL ANSWERS IN SI UNITS.

1. Briefly answer the following short-answer questions: (2 pts each)

   a) How do you find the acceleration graphically?

   b) List two factors that influences the value of gravity.

   c) Is the magnitude of the average velocity equal to the average speed?

   d) What is a reference frame?

   e) What is an object in free-fall?

2. A rock is thrown vertically upward from ground level at t = 0. At t = 2.0 s it passes the top of a tall tower, and 1.3 s later it reaches the maximum height. (10 pts)
   a) Calculate the height of the tower.
   b) Calculate speed when it strikes ground.
   c) Sketch the graph of y vs. t, v vs. t, and a_y vs. t for the entire motion of the ball and label all pertinent information.

3. An air balloon is moving upward at a constant speed of 3 m/s. Suddenly a passenger realizes that she left her phone on the ground. A friend picks it up and throws it upward at 15 m/s at the instant the passenger is 4 m above the ground.

a) Calculate the position of the passenger when she catches the phone.
b) Calculate the velocity of the phone when passenger catches it.
c) If the passenger misses catching phone, calculate the maximum height.

4. A car and a truck are heading directly toward one another on a straight and narrow street, but they avoid a head-on collision by simultaneously applying their brakes at t = 0. Using the graph below calculate the separation between the cars when they have come to a stop, given that at t = 0 the car is at x = 20 m and the truck is at x = - 40 m. (10 pts)