Name: _____ Physics 11

Problem Set 1.4
Kinematics Graphs

1. Rennata Gass is driving through town at 25 m/s and begins to accelerate at a constant rate of -1 m/s^2. Eventually Rennata comes to a complete stop.
    a. Sketch a velocity-time graph of Rennata's motion.
    b. Use your graph to determine the distance traveled while accelerating.

2. Otto Emissions is driving his car at 25 m/s. Otto accelerates at 2 m/s^2 for 5 seconds. Otto then maintains this constant velocity for 10 seconds.
    a. Sketch a velocity-time graph for Otto's motion, starting at the instant he begins accelerating.
    b. Use your graph to determine the distance Otto traveled during the entire 15 seconds.

3. Chuck Wagon travels with a constant velocity of 0.5 m/s for 10 s. Chuck then accelerates at -0.25 m/s^2 for 2 seconds.
    a. Sketch a velocity-time graph for Chuck's motion.
    b. Use the velocity-time graph to determine the total distance traveled by Chuck during the 12 seconds of motion.

4. Vera Side is traveling down the interstate at 45 m/s. Vera looks ahead and observes an accident which results in a pileup in the middle of the road. By the time Vera slams on the brakes, she is 50 m from the pileup. She slows down at a rate of -15 m/s^2.
    a. Sketch a velocity-time plot for Vera Side's motion.
    b. Use the plot to determine the distance which Vera would travel prior to reaching a complete stop (ignore the fact that there's a pileup).
    c. Using your answer from (b), does Vera hit the pileup?

5. Earl E. Bird travels at 30 m/s for 10 seconds. He then accelerates at 3 m/s^2 for 5 seconds.
    a. Sketch a velocity-time graph for Earl E. Bird's motion.
    b. Use your plot to determine the total distance traveled.

6. Luke Autbeloe, a human cannonball artist, is shot straight up in the air with an initial velocity of 40 m/s upwards. The cannon that shoots Luke is placed beside a bottomless pit, so after Luke reaches the top of his trajectory he falls down *past* the cannon. Luke's acceleration while he's in the air is *approximately* 10 m/s^2 downwards.
    a. Sketch a velocity-time graph for the first 10 seconds of Luke's motion.
    b. Using your graph, determine the time required for Luke Autbeloe to drop back to ground level. Indicate this time on your graph.