

Mrs. Seto-Rosen's Skydiving Adventure

Name _____ Date _____ Class _____

Please watch the video of my graceful(?) descent from the heavens. Take your time in answering the following questions. Please **write out all necessary formulas** next to each question and **show all of your work!** You will need to use **factor analysis** (unit cancellation) for some of the problems. Make sure to properly **label units** and put a **box around each answer**. *Good Luck!*

Questions

1. In metrics, what are the standard units for:

a. distance _____	d. acceleration _____
b. time _____	e. mass _____
c. speed/velocity _____	f. force _____

2. When I jumped out of the plane, I continued to move in the same direction that the plane was moving in addition to falling. Which of Newton's Laws does this illustrate? Explain.

3. Is it more correct for me to refer to the rate at which I was falling as speed or velocity? Explain.

4. What is terminal velocity? (see page 39-43)

5. Draw a force diagram (using vectors ie. arrows) that illustrates me falling at terminal velocity.

6. What were some of the things that you observed either me or my instructor doing that affected our terminal velocity? Explain.

7. I fell from a height of 13,000 feet. Please convert this distance to

a. miles (1 mile = 5,280 feet)

- b. meters (1 meter = 3.28 feet)
 - c. kilometers (you know this one!)
8. I was travelling at an average velocity of 120 mph. Please convert this to meters/second (m/s).
9. When was I most aware of the speed at which I was travelling? When I was moving at a fairly constant speed or when I was changing speed? (Think of yourself travelling in a car, are you more aware of your speed while going a constant velocity or when changing velocity?) Why?
10. What can you say about the forces acting on me when I was falling at terminal velocity? When I was accelerating? Explain referencing pages from the textbook.
11. What is the equation for average speed?
12. I fell the first 4,000 feet in 1.0 minute. Calculate my average speed in
- a. ft/s
 - b. m/s
 - c. km/hr
13. What is an equation that describes the relationship between velocity, acceleration and time?
14. If I reached a terminal velocity of 200 km/hr in 1.5 minutes, then what was my average acceleration in m/s^2 ?

15. Why was my acceleration during free fall not the expected 9.8m/s^2 ?
16. The relationship between distance, acceleration and time can be described by the equation $d=1/2at^2$. Please solve the equation for time.
17. At the acceleration you calculated in question #14, how long would it take me to reach the ground? (You will need to use the equation that you just derived and refer to #7 to get the total distance.)
- in seconds
 - in minutes
18. If I had been falling with the acceleration "g", how far could I have traveled in the same amount of time?
- in meters
 - in miles
19. If was doing a solo jump instead and jumped at the same time as my instructor (who probably weighed about twice as much as me) and we were in an extremely large vacuum, who would land first? Explain.
20. Since people do not usually jump in a vacuum, answer the same question, but taking into account air resistance.
- Which one of us would hit the ground first? Explain.
 - Which one of us would reach terminal velocity first? Explain.
 - How could our equipment be changed to that we could fall at basically the same rate?