

COMMENT ON PROBLEM SOLVING:

When you write up your solutions, you should have a document that is very helpful to you come exam time. A problem solution that is just some equations, a few lines of algebra, and a couple of numbers not help you study at all. When you study for an exam you want to fully understand the reasoning behind the solution and the best way to describe the reasoning is with words and pictures. You will always see me draw sketches and writing the words that explain what I am doing. I expect you to do the same thing. In summary, a proper problem solution includes:

- A sketch of the important features of the problem.
- A clearly identified coordinate system, if needed.
- A list of known quantities.
- A list of the quantities you intend to find.
- The names of the relevant definitions, laws, and useful relationships you use.
- A written explanation of the reasoning required for the key steps.
- The algebra done first, then the numbers plugged in.
- A clear indication of the final answer (such as a box around it)
- A final written comment about the result.

1. A runner stealing second base is running at 8.00m/s . Second base is 2.00m away when she begins her slide into the base. Assume during the slide she is decelerating at a constant rate and her speed reaches zero just as she touches second base. Find (a) the time for her to get to second base and (b) her acceleration during the slide.

2. A wildly erratic driver traveling at highway speeds has only 100m to pass a slower car. Making a bad decision, he accelerates at a constant rate for 3.20s to pass the car and notices he reaches a speed of 150km/h (95mph). Find (a) the initial velocity and the (b) acceleration of the car.

3. On Apollo 15 Commander David Scott held out a 1.32-kg geologic hammer and a 0.03-kg falcon feather and dropped them at the same time. They were dropped from a height of 1.60m and both hit the ground at the same time 1.41s later. Find (a) the acceleration due to gravity on the moon and (b) the velocity with which they hit the ground. You can watch this experiment at (http://nssdc.gsfc.nasa.gov/planetary/lunar/apollo_15_feather_drop.html).

4. There seems to be some dispute about the true height of Feather Falls, which is a terrific nearby day hike that I highly recommend. Some say it is 640ft tall making it the sixth highest waterfall in the continental US. Others (<http://www.waterfallswest.com/waterfall.php?id=203>) claim it is only 410ft tall. Find (a) the time for water to fall from the top if it is 640ft high and (b) the time if it is 410ft . If you could watch an isolated drop of water fall, do you think you could tell who is right?