Prelab 2:
Speed of Sound

PHYS 1320
Fall 2013
Due at the beginning of class!!!

(Note: SMU-light is a newly discovered light-like wave that travels at a speed much different from ordinary light. The numbers are chosen to make the math simple.)

1) Galileo sends his assistant 10 miles away, and exchanges SMU-light flashes. He observes that the SMU-light flashes take 20 seconds to travel the round trip distance (20 miles). If at this point we assume the time delay is all due to the speed of SMU-light, compute the speed we would observe. (This is not the real value, but it is illustrative to compute it.)

2) Galileo then sends his assistant 20 miles away and observes the SMU-light takes 30 seconds. From this determine the true speed of SMU-light.
Hint:
    Step A: To go the extra distance of x miles, it takes the SMU-light an extra y seconds.
    Step B: From this, we deduce that the true speed of SMU-light $= \frac{distance}{time} = \frac{x}{y}$.

3) Now work backwards to find out the reaction time of Galileo's assistant.
Hint: Knowing the TRUE speed of SMU-light from part 2, find out how long it really takes SMU-light to travel the distance in part 1. Compare this to the time of part 1. The difference is the reaction time of the assistant.

4) Explain how we were able to use two separate measurements to eliminate the reaction time of the assistant from the final answer for the speed of SMU-light.