Calculus: Space-Time Diagrams

You are testing a new autonomous vehicle prototype. You outfit the vehicle with a suite of sensors, run an experiment through a city, and collect its velocity data. You then re-run the experiment, but the sensors glitched the velocity data is mildly corrupted. The data are stored in the `ME2004_VelocityData.mat` file. Upon loading the .mat file, you will see the following variables in the Workspace:

- `t`: Trial 1 time vector
- `v`: Trial 1 velocity
- `t2`: Trial 2 time vector
- `v2`: Trial 2 velocity

You would like to create the vehicle's space-time (otherwise known as position-time) diagram because the onboard GPS unit was also found to be defective.

a) Compute and compare the total distance traveled in each trial. Does the second trial's data tend to over or underestimate relative to the first trial's data?
b) Create the space-time diagrams for each trial. You may find the `cumtrapz()` function handy. Does your space-time diagram corroborate your results from (a)?