Use the Python simulation, graphs of velocity vs. time, and what you know about objects traveling at constant velocity to answer the following questions.

1. A car is traveling at 10 m/s and hits the brakes, undergoing a constant acceleration of -1.5 m/s^2 .
   a) Draw a velocity vs. time graph for the movement of this car.
   b) At what time does the car have zero velocity?
   c) Find the displacement of the car from the moment when the brakes are pressed to when it stops.
   d) Draw a position vs. time graph for the time interval you used to find displacement in (c).

2. Recreate the following table of position and velocity values in the Python simulation. Try to minimize the amount of trial and error – what can you find/calculate from this given information? Finally, draw position, velocity, and acceleration vs. time graphs for the object described in the table.

```
Time (s): 0  Current Position (m): 2.5  Current Velocity (m/s): 3.1
Time (s): 1.0  Current Position (m): 5.3  Current Velocity (m/s): 2.5
Time (s): 2.0  Current Position (m): 7.5  Current Velocity (m/s): 1.9
Time (s): 3.0  Current Position (m): 9.1  Current Velocity (m/s): 1.3
Time (s): 4.0  Current Position (m): 10.1  Current Velocity (m/s): 0.7
Time (s): 5.0  Current Position (m): 10.5  Current Velocity (m/s): 0.1
Time (s): 6.0  Current Position (m): 10.3  Current Velocity (m/s): -0.5
Time (s): 7.0  Current Position (m): 9.5  Current Velocity (m/s): -1.1
Time (s): 8.0  Current Position (m): 8.1  Current Velocity (m/s): -1.7
Time (s): 9.0  Current Position (m): 6.1  Current Velocity (m/s): -2.3
Time (s): 10.0  Current Position (m): 3.5  Current Velocity (m/s): -2.9
```

3. Find the final velocity of an object that and starts at 3 m/s and .accelerates at a constant 2.5 m/s^2 for 5 seconds.

4. How long does it take for an object that is initially traveling in the positive direction at 10 m/s to have a speed of 10 m/s in the negative direction if its acceleration is 0.5 m/s^2 ? In what direction is the acceleration? What is the displacement of this object over this time interval?

5. If a ball is thrown from the ground with an initial velocity of 20 m/s and it undergoes an acceleration of -9.8 m/s^2 , at what time does it reach a maximum position? What is its displacement at this time?