Moving Man Simulation

Using the Moving Man Simulation, investigate how the controls work and answer the questions below. The simulation is located at http://phet.colorado.edu/new/index.php. In this simulation, the distance traveled is given the symbol x. This and d are both commonly used for 1D motion.

1. Where is the time displayed? _____
2. The three motion graphs displayed are x-t, _____ and _____.
3. The man has a habit of running into the wall. How do you remove the wall? _____
4. Change the magnitude of the velocity in the velocity box to 1m/s. Press play to allow the moving man to move for approximately two seconds before pressing stop. His motions have been recorded. Now click on the playback button and then click play. A thin gray vertical bar leads the graphing line. This bar marks the time for the values in the boxes at the left. What happens when you grab the bar and move it? _____

The values for x, v, and a, are shown in the box on the left. Only two significant figures are displayed for the time, while the boxes display three digits for x, v, and a.

5. Remove the wall. Set a = 0, v = 0.5, and x = 0 at the start (initial conditions) and run (record) the simulation for approximately 3 seconds. From the simulation, select playback to play the recording.
   - By moving the vertical bar, can you set the time at 1.0 s? _____ (yes/no)
   - What is the v value in the box at exactly 1.1 s? _____ m/s: What is the calculated velocity from the d/t data? _____m/s
   - Carefully drag the vertical bar so that the time remains the same, but the displacement changes. What is the v value in the box at 1.1 s? _____ m/s: What is the calculated velocity from the d/t data? _____ m/s
   - What is the x value in the box at t = 0 sec? _____ m: What is the calculated displacement from the data? _____m
   - What value do you calculate for the v value at a displacement of 1.0 m? _____ m/s

Some programs do not use the exact equations to simulate motion, but rely on approximate methods which may be easier to program and may intentionally introduce "error fluctuations" to the results. The values in the boxes are accurate to three significant figures.

6. Set a = 0.5, v = 0, x = 0 and run the simulation for 2 seconds. Examine the values at a position of 1.13 m.
   - What is the measured time? _____s
   - What is the velocity value in the box? _____m/s
   - What is the acceleration value in the box? _____m/s^2
   - Using your kinematic equations and the data provided in the boxes, calculate the acceleration.
   - Does the calculated acceleration agree with the data in the acceleration box? _____
7. Set a = 0.5, v = 0.5, x = 0 and run the simulation for 2 seconds. Examine the values at a position of 1.53 m.

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- What is the measured time? _____s
- What is the velocity value in the box? _____m/s
- What is the acceleration value in the box? _____m/s^2
- Using your kinematic equations and the data provided in the boxes, calculate the acceleration.

- Does the calculated acceleration agree with the data in the acceleration box?

8. From your experience with this simulation, what has given you more accurate results, the calculated data or the data provided in the boxes by the simulation?