PreAP Linear Motion 8

Use your Kinematic Equation notes to answer the following.

1. Top drag racers (starting from rest) make the 305 m in just under 3.8 seconds. Calculate the dragster's acceleration.

   A. ***Assign Variables***: (including "unknown" and "not used")

   $\Delta x =$

   $Vi =$

   $Vf =$

   $a =$

   $t =$

   B. *** Equation**:

   C. * **Put in #s and solve**:

2. A person walking 2.5 m/s to the left, slows down, stops, turns around, and ends up going 2 m/s to the right in 4.5 seconds. How far did they end up from their initial position?

   A. ***Assign Variables***: (including "unknown" and "not used")

   $\Delta x =$

   $Vi =$

   $Vf =$

   $a =$

   $t =$

   B. **Equation**:

   C. **Put in #s and solve**:

3. Slim Jim decides to skip work. So on his "day off" he takes a breakfast journey to his favorite donut shop a couple of towns away. Since it is a long journey, we will use miles, instead of meters, and hours, instead of seconds. A convenient table has been given to you to help you keep track of distances and times.

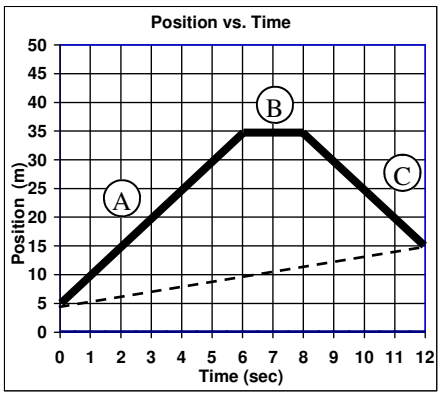
	Distance (miles)	Total Distance	Time (hours)	Total Time
I. **Across town.** Slim Jim leaves home. Due to traffic, he takes an hour to travels the 10 miles to the edge of town.				
II. **Town to Doughville.** Now able to open the throttle, Slim Jim makes the 90 miles to the SugarShack Donut shot in Doughville in an hour and a half.				
III. **Breakfast**. Slim Jim loves his donuts, so he stays for a hour, indulging himself with sugar and coffee.				
IV **Doughville back to town.** Unfortunately there is an accident somewhere on the road and it takes him 3 hours to make the 90 miles back to town.				
V. **Lunch.** Having now missed his lunch, Slim Jim decides to stop a Chubby's for BBQ. He takes an hour for lunch.				
VI **Across town to home.** After lunch there is no traffic so he makes the 10 miles across town and back home in only 1/2 hour.				

   A. * Assuming Slim Jim's speed stays constant from the time he leaves home until he reaches to the edge of town, calculate his instantaneous speed 10 minutes into his journey (in mph).

   B. Remembering that average velocity is displacement divided by total time ($v = \Delta x/\Delta t$), calculate Jim's average velocity from home to the Sugar Shack.

   C. What is Slim Jim's average velocity from the Sugar Shack back home. (You have to include the time for lunch.)

   D. * Remembering that displacement is the straight line distance between the initial and final positions, what is Jim's average velocity for the entire journey?



4. Calculate the velocity of the object during line segment A.

We showed you that average velocity = Δx/Δt, where Δx is the displacement. Graphically, this is slope, also. Notice the dashed line on the graph, which represents the average velocity of the object for the first 12 seconds.

5. * What is the average velocity for the object for the entire 12 seconds of the graph?

1B) Use $\Delta x = v_i t + \frac{1}{2}at^2$. And only the t is squared. 1C) 42.2 m/s^2
(wow!)

3A) 10mi/1hr = 10 mph. If speed stays constant, his instantaneous speed (what he sees on his speedometer stays at 10 mph.

3D) he returned home, so displacement is 0.

5) 10/12 = 0.83 m/s