Position, speed, velocity, and acceleration problems
Physics – 0.5 pts each – scored out of 5 points total

Name:
Period: N/A

Please refer to your equation sheet.

An army of students sets out to measure the modest walk of an ordinary ant along a clothesline. Students with meter sticks and stopwatches make the following measurements.

Clock Reading t	*Position x along the clothesline*
12:15:32 PM	0.00 m
12:15:33 PM	0.01 m
12:15:34 PM	0.02 m
12:15:35 PM	0.03 m
12:15:36 PM	0.05 m
12:15:37 PM	0.07 m
12:15:38 PM	0.07 m
12:15:39 PM	0.06 m
12:15:40 PM	0.05 m

1. How far does the ant travel in the first three seconds?

   $d =$

2. In which direction is the motion between :38 and :39 seconds after 12:15? Circle one.

   POSITIVE x DIRECTION

   NEGATIVE x DIRECTION

3. What is the average speed during the first second of travel?

   $v_{avg} =$

4. What is the displacement of the ant from the origin at the end of the measured motion?

   $\Delta x =$

5. What is the average *velocity* of the ant during this entire measurement period?

   $\mathbf{v}_{avg} = \Delta x / \Delta t =$

6. Near approximately which times did the ant stop completely?

   $t =$

7. What was the total distance traveled by the ant over the entire measurement period?

   $d_{total} =$

8. What is the average *speed* of the ant during this entire measurement period?

   $v_{avg} = d_{total} / \Delta t =$

9. Think about this carefully: why would physicists want to make a distinction between *distance* and *displacement*. That is, why are the answers to #4 and #7 different? Why do we need both concepts? Answer in at least one paragraph on a separate sheet of binder paper. Staple that sheet to this document when finished.

10. Think about this carefully: why would physicists want to make a distinction between average *velocity* and average *speed*? That is, why are the answers to #5 and #8 different? Why do we need both kinds of concepts? Answer in at least one paragraph on a separate sheet of binder paper. Staple that sheet to this document when finished.

END OF WORKSHEET