Constant Velocity Problem Set

1. A honeybee leaves the hive and travels 2 km before returning. Is the displacement for the trip the same as the distance traveled? If not, why not?

2. On the graph below what is the total distance traveled during the recorded time interval? What is the displacement?



3. Sketch a position-time graph for each of the following situations:

a. an object at rest

b. an object with constant positive velocity

c. an object with constant negative velocity

4. If the average velocity of a duck is zero in a given time interval, what can you say about the displacement of the duck for that interval?

5. Velocity can be either positive or negative, depending on the direction of the displacement. The time interval, Δt, is always positive. Why?

6. A school bus takes 0.530 h to reach the school from your house. If the average velocity of the bus is 19.0 km/h to the east, what is the displacement? (*10.1 km*)

7. Below is the position-time graph for a squirrel running along a clothesline.

a. What is the squirrel’s displacement at the time t = 3.0 s? *(-2.0 m)*

b. What is the squirrel’s average velocity during the interval between 0.0 s and 3.0 s? *(-0.67 m/s)*



8. Sound travels at a constant speed of 343 m/s in air. Approximately how much time (in seconds) does it take for the sound of thunder to travel 1609 m (one mile)? *(4.69 s)*

9. In 1985, Said Aouita set the world record for 1500 m race in a time of 3:29.46. What was his average speed? *(7.16 m/s)*

10. An 18-year-old runner can complete a 10.0 km course with an average speed of 4.38 m/s. A 50-year-old runner can cover the same distance with an average speed of 4.27 m/s. How much later should the younger runner start in order to finish the course at the same time as the older runner? *(58.8 s)*

11. Runner A is initially 6.0 km west of a flagpole and is running with a constant velocity of 9.0 km/h due east. Runner B is initially 5.0 km east of the flagpole and is running with a constant velocity of 8.0 km/h due west. What will be the distance of the two runners from the flagpole when their paths cross? (It is not necessary to convert your answer from km to m for this problem.) (0.2 km west of the flagpole)