

Physics

name _____ period _____

Inv-1 Expan V More 1D Motion Prob

sheet # _____

*Show All Work and Units**write small***Box In Answers** n^3

1.) An athlete swims the length of a **50 m** pool in **20 secs.** and makes the return trip to the starting position in **22 secs.** Determine the average velocity (a) during the first half of the swim, and (b) during the second half of the swim, and (c) the entire trip.

2.) A jogger runs eastward in a straight line with an average velocity of **2 m/s** for **5 min** and then continues with an average velocity of **1.5 m/s** for **2 min.** (a) What is her total displacement? (b) What is her average velocity during her entire 7 minute run?

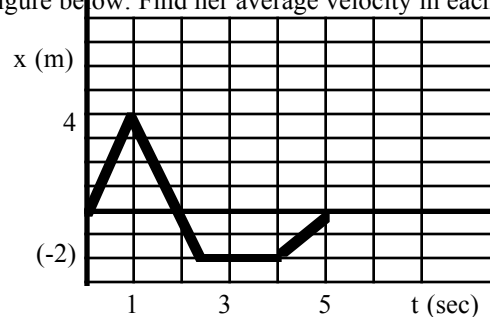
3.) A tennis player moves in a straight-line path as shown in the figure below. Find her average velocity in each given time interval.

(a) 0 to 1 sec.

(b) 0 to 4 secs.

(c) 1 to 5 secs.

(d) 0 to 5 secs.



4.) A car traveling in a straight-line path has a velocity of **10 m/s** at some instant. After **3 secs** its velocity is **6 m/s**. What is the average acceleration during this time interval?

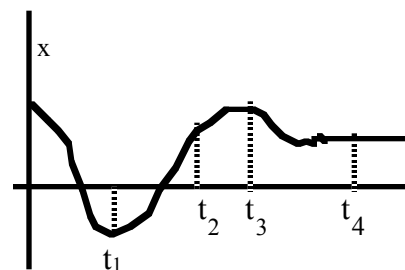
5.) The position-time graph for a bug crawling along the x axis is shown in the figure below. Determine whether the velocity is positive, negative, or zero for the times

(a) t_1

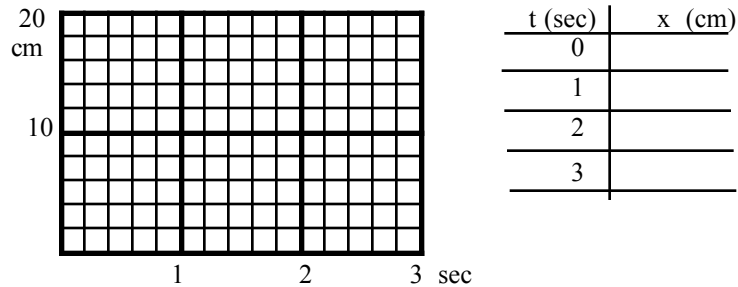
(b) t_2

(c) t_3

(d) t_4



6.) It is found that the position of a model airplane as a function of time is given for a portion of time by the equation $x = 2t^2$. Plot a graph of this equation from $t = 0$ to $t = 3$ secs. From your graph find (a) the average velocity during this 3 sec interval and (b) Draw tangent lines at 1.0 sec and 2.0 sec to estimate the instantaneous velocities at these times. (If you know calculus, you can use derivatives to verify the EXACT instantaneous vels)



7.) A certain car is capable of accelerating at a rate of 0.6 m/s^2 . How long a time is taken for this car to go from a velocity of 55 mi/h to a velocity of 60 mi/h ?

8.) A speedboat increases its velocity from 20 m/s to 30 m/s in a distance of 200 m . Find (a) the magnitude of its acceleration and (b) the time it takes for the boat to cover the 200 m .

9.) A car starts from rest and accelerates at 0.3 m/s^2 . What is the velocity of the car after it has traveled 25 m ?

10.) A racing car reaches a speed of 40 m/s . At this instant, it begins a uniform negative acceleration using a parachute and a braking system and comes to rest 5 secs . later. (a) Determine the acceleration of the car. (b) How far does the car travel after the acceleration starts?

11.) A car accelerates uniformly from rest to a velocity of 40 mi/h in 12 secs . (a) Find the distance the car travels during this time, and (b) the constant acceleration of the car.

12.) An electron moving in a straight line has an initial velocity of $3.0 \times 10^5 \text{ m/s}$. If it undergoes an acceleration of $8.0 \times 10^{14} \text{ m/s}^2$. (a) How long will it take to reach a velocity of $5.4 \times 10^5 \text{ m/s}$, and (b) how far will it have traveled in this time?

1a) 2.5 m/s 1b) -2.27 m/s 1c) 0 2a) 780 m 2b) 1.86 m/s 3) YD 4) -1.33 m/s^2 5) YD 6a) 6 cm/s 6b) 4 cm/s ; 8 cm/s 7) 3.7 s
 8a) 1.25 m/s^2 8b) 8.0 s 9) 3.87 m/s 10a) -8 m/s^2 10b) 100 m 11a) 107.3 m 11b) 1.49 m/s^2 12a) 300 ps 12b) $126 \mu\text{m}$