PHY 113 A General Physics I
9-9:50 AM MWF Olin 101

Plan for Lecture 2:

Some announcements

Chapter 2 – Motion in one dimension

1. **Position, time, velocity**
2. **General examples**
3. **Constant velocity**

Some updates/announcements

According to the class vote -- changes to exam schedule:

Grading:

It is likely that your grade for the course will be determined by the following factors:

4 exams*	45%
Final exam	25%
Problems sets**	15%
Laboratory work***	10%
Quiz****	5%

* In order to relieve exam stress, the 3 highest exam scores will be scaled to 13 points each while the lowest score will be scaled to 6 points.

Some updates/announcements

According to class vote – changes to exam schedule:

No.	Lecture Date	Topic	Text Sections	Problem Assignments	Assignment Due Date
1	08/29/2012	Units & measurement	1.1-1.6	1.2,1.6,1.13,1.20	
2	08/31/2012	Motion in 1d -- constant velocity	2.1-2.3	2.1,2.8	09/07/2012
3	09/03/2012	Motion in 1d -- constant acceleration	2.4-2.8	2.13,2.16	09/07/2012
4	09/05/2012	Vectors	3.1-3.4		09/07/2012
5	09/07/2012	Motion in 2d	4.1-4.3		09/10/2012
6	09/10/2012	Circular motion	4.4-4.6		09/12/2012
7	09/12/2012	Newton's laws	5.1-5.6		09/14/2012
8	09/14/2012	Newton's laws applied	5.7-5.8		09/17/2012
	09/17/2012	Review	1-5		
	09/19/2012	Exam	1-5		
9	09/21/2012	More applications of Newton's laws	6.1-6.4		09/24/2012
10	09/24/2012	Work	7.1-7.4		09/26/2012

Tentative list of exam dates:

1. Wednesday, September 19, 2012
2. Monday, October 8, 2012
3. Friday, November 2, 2012
4. Wednesday, November 28, 2012

iclicker exercises:

Webassign Experiences so far

A. Have not tried it
B. Cannot login
C. Can login
D. Have logged in and have completed one or more example problems.

Textbook Experiences

A. Have no textbook (yet)
B. Have complete physical textbook
C. Have electronic version of textbook
D. Have Volume I physical textbook
E. Textbook is on order

Starting September 3, 2012

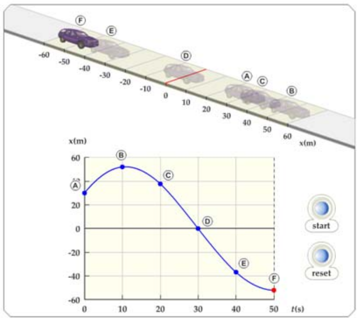
Schedule for Physics 113 Tutorials
5-7 PM in Olin 101

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Loah Stevens	Jiajie Xiao	Jiajie Xiao	Stephen Baker	Stephen Baker	Loah Stevens

First Webassign sets "due" on Friday, Sept. 7th

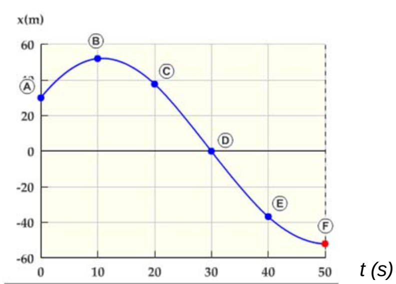
PHY 113 Labs start September 3, 2012
(Please see Eric Chapman in Olin 110 chapmaek@wfu.edu for all of your laboratory concerns)

Motion in one-dimension



	t(s)	x(m)
A	0	30
B	10	52
C	20	38
D	30	0
E	40	-37
F	50	-53

Graphical representation of position (displacement) *x(t)*



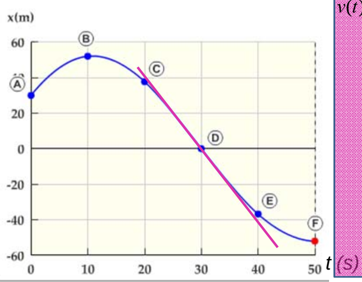
Comment:

Your text mentions the notion of a "scalar quantity" in contrast to a "vector quantity" which will be introduced in Chapter 3. In most contexts, a scalar quantity – like one-dimensional distance or displacement can be positive or negative.

Another comment:

Your text describes the time rate of change of displacement as "velocity" which, in one-dimension is a signed scalar quantity. In general "speed" is the magnitude of velocity – a positive scalar quantity.

Graphical representation of position (displacement): *x(t)*
➔ time rate of change of displacement = velocity: *v(t)*



velocity:

$$v(t) \equiv \lim_{\Delta t \to 0}\left(\frac{x(t+\Delta t)-x(t)}{\Delta t}\right)$$

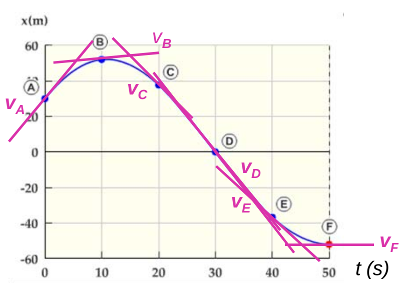
$$= \frac{dx}{dt}$$

$$v(t) = \frac{x(40)-x(20)}{40s-20s}$$

$$\approx \frac{-40m-40m}{20s}$$

$$= -4\ m/s$$

Instantaneous velocity



Demonstration of tangent line limit

Instantaneous velocity:

$$v(t) \equiv \lim_{\Delta t \to 0}\left(\frac{x(t+\Delta t)-x(t)}{\Delta t}\right)$$

$$= \frac{dx}{dt}$$

Average velocity versus instantaneous velocity

Instantaneous velocity:

$$v(t) \equiv \lim_{\Delta t \to 0} \left(\frac{x(t+\Delta t) - x(t)}{\Delta t} \right) = \frac{dx}{dt}$$

Average velocity:

$$\langle v \rangle_A^B = \frac{\int_{t_A}^{t_B} v(t)dt}{t_B - t_A} = \frac{x(t_B) - x(t_A)}{t_B - t_A}$$

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Average velocity

The previous stated:

$$\langle v \rangle_A^B = \frac{x(t_B) - x(t_A)}{t_B - t_A}$$

iclicker exercise:

This results is:

A. Exact
B. Approximate

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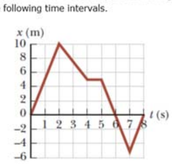
Webassign Example

1. –/0.5 points | My Notes | SerPSE8 2.

The position versus time for a certain particle moving along the *x* axis is shown in the figure below. Find the average velocity in the following time intervals.



(a) 0 to 2 s
m/s

(b) 0 to 4 s
m/s

(c) 3 to 6 s

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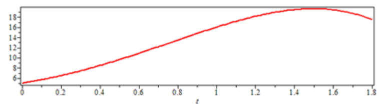
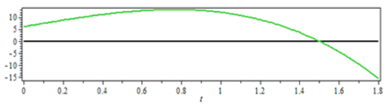
Instantaneous velocity using calculus

Suppose:

$x(t) = 5 + 6t + 7t^2 - 2t^4$



$v(t) = \frac{dx}{dt} = 6 + 14t - 8t^3$



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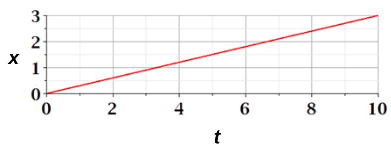
Anti-derivative relationship

Constant velocity motion

Suppose: $\frac{dx}{dt} = v_0$

Then: $x(t) = x_0 + v_0 t$

Example -- suppose $x_0 \equiv 0$ and $v_0 \equiv 0.3$ m/s:



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