

# Announcements – 3 Sep 2013

1. Welcome to Physics 105! I'm Dr. Colton
2. Prayer
  - Prayer sign-up,  
<https://docs.google.com/spreadsheets/cc?key=0Ame3-9U45-VddGp6UWFDZ2ljTIZEVlhPaW12bGpISkE&usp=sharing>
3. Answer to a common question:
  - The Physics 107 Lab is completely separate from this course, since it's not required for all majors. I know practically nothing about it.
4. As most of you have found out already, I send out periodic class-wide emails. Make sure your myBYU email address is current.
5. TA: Shaun Livingston

# Introductory Stuff

## Class website

## Syllabus

- Learning outcomes
- Letter grade boundaries
- Grading categories: warmup quizzes, clicker quizzes, HW, exams, final

## Learning Suite

- “Digital Dialog” only (class discussion forum)
- Will start after add/drop deadline

## Max

- CID
- Register clicker
- Calendar
- Warmups (due 15 mins before class)
- HW (due 11:59 pm)
- Checking your grade

## More stuff you should know from syllabus:

- Four free warmup quizzes
- Four free clicker quizzes
- Four free late HW
- Additional Resources
- Cheating
- Extra Credit
- BYU Policies

Read about them  
on your own!

## Extra documents at the end of the syllabus

- Free body diagram instructions
- How to solve physics problems: PEANuT
- How to study for this physics course
- Reading effectively
- Extra credit book list
- Chapter summaries of mathematical relations
- List of equations for exams
- Forms for you to use to turn in FBDs

Read about them  
on your own!

**The best study aid:** the other students! Take two minutes now to exchange names/numbers/emails with 3-4 people sitting near you.

**First clicker quiz:**

I now have the names/numbers/emails of 3-4 other people in the class.

a. True

Pause for questions...

...and now, for the **Physics**

## Chapter 1: Units/Trigonometry

- skipped, but you do need to know
  - how to convert units
  - how to do basic Trig
- you don't need to know “sig figs”

# Chapter 2: Kinematics

## mathematical description of motion

Recording motion:     Choose an origin (zero)  
                          Choose a + direction.

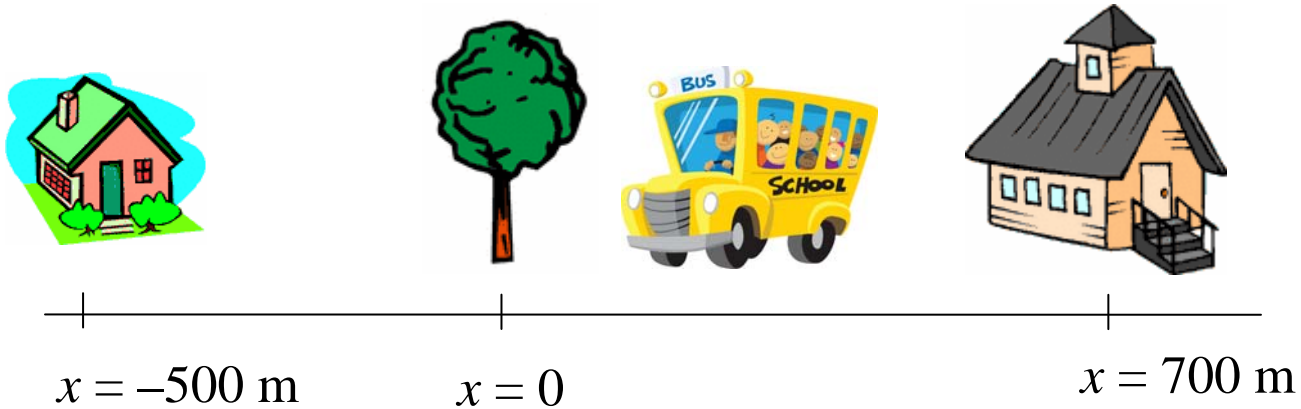


Table: Bus's position

Plot

$t$ (min)	$x$ (m)
0	250
2	-500
3	-500
10	700

What is the bus doing?

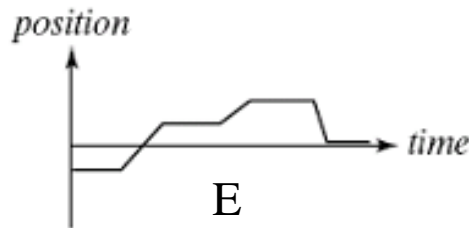
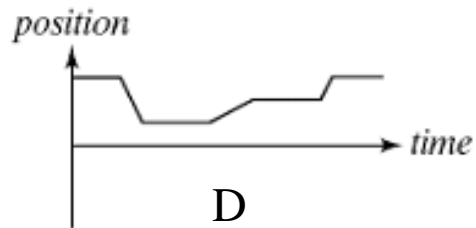
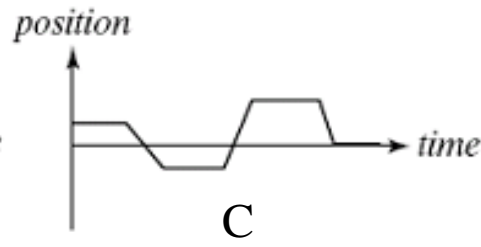
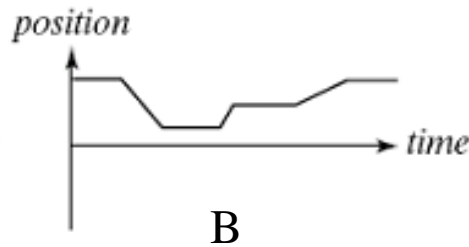
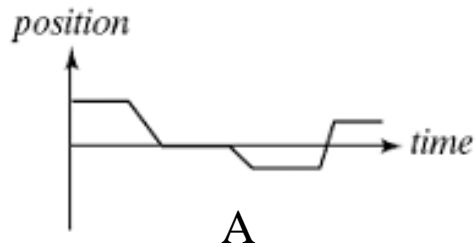
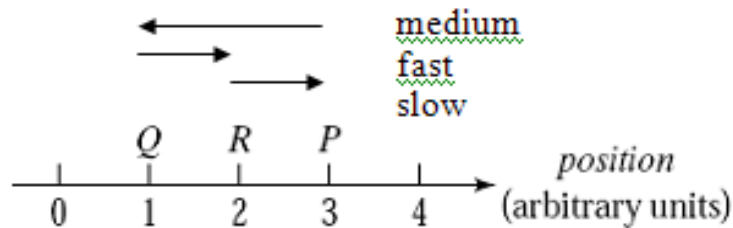
Where is it going the fastest? Slowest?

When is it moving to the right? To the left?



## Clicker quiz:

Nancy, initially at point  $P$  in the illustration, stays there a moment and then moves along the axis to  $Q$  and stays there a moment. She then runs quickly to  $R$ , stays there a moment, and then strolls slowly back to  $P$ . Which of the  $x(t)$  graphs below correctly represents this motion?

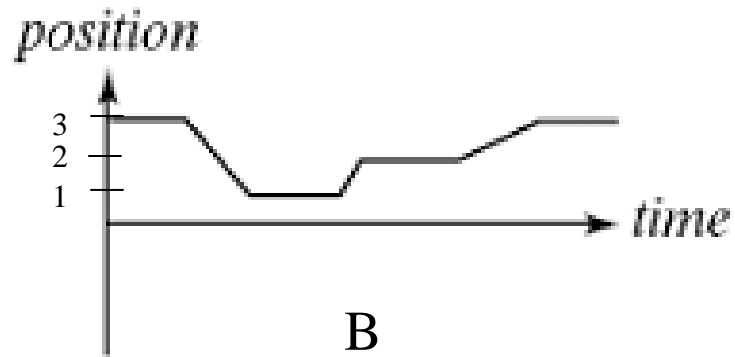


# Position vs. Displacement

**From warmup:** What's the difference between position and displacement?

**“Pair share”** – Find out your neighbor’s answer, be prepared to share it with the class (volunteer if you think it’s particularly good).

**Clicker:** I am now ready to share my neighbor’s answer if called on.  
a. Yes



**Question:** what was Nancy's total change in position?

**Question:** what was Nancy's total displacement?

**Position:** where something is located, often labeled by **x**

**Displacement:** a change in position, often labeled by  **$\Delta x$**

$$\Delta x = x_f - x_0$$

$f$  = “final”     $0$  = initial, pronounced “naught”  
also sometimes written as  $x_i$

What do we mean by +/- **position**?

Being on the right/left side of the *origin*

What do we mean by +/- **displacement**?

Has *shifted* to the right or left

# Velocity

**velocity**: rate of change of position

**average velocity**,  $v_{ave} =$

sometimes written  $\langle v \rangle$

→ must always specify the time interval (start/end times)

## Slope

# Speed vs. Velocity

**Speed vs velocity:** are they the same thing?

**From warmup:** Give an example where your average velocity could be zero, but your instantaneous velocity could be non-zero.

**“Pair share”**—I am now ready to share my neighbor’s answer if called on.

a. Yes

**From warmup:** Give an example where your average velocity could be non-zero, but your instantaneous velocity could be zero.

**“Pair share”**—I am now ready to share my neighbor’s answer if called on.

a. Yes

**Problem:** On the Tour de Provo, bicyclists ride straight south for 3 hours at 8 km/hr, rest for 2 hours, then continue their ride south down a mountain for 1 hour at 20 km/hr. What is their average velocity for the day?

From “Problem Solving” section of syllabus: PEANuT

**Picture**

**Equations**

**Algebra**

**Numbers**

**Think**

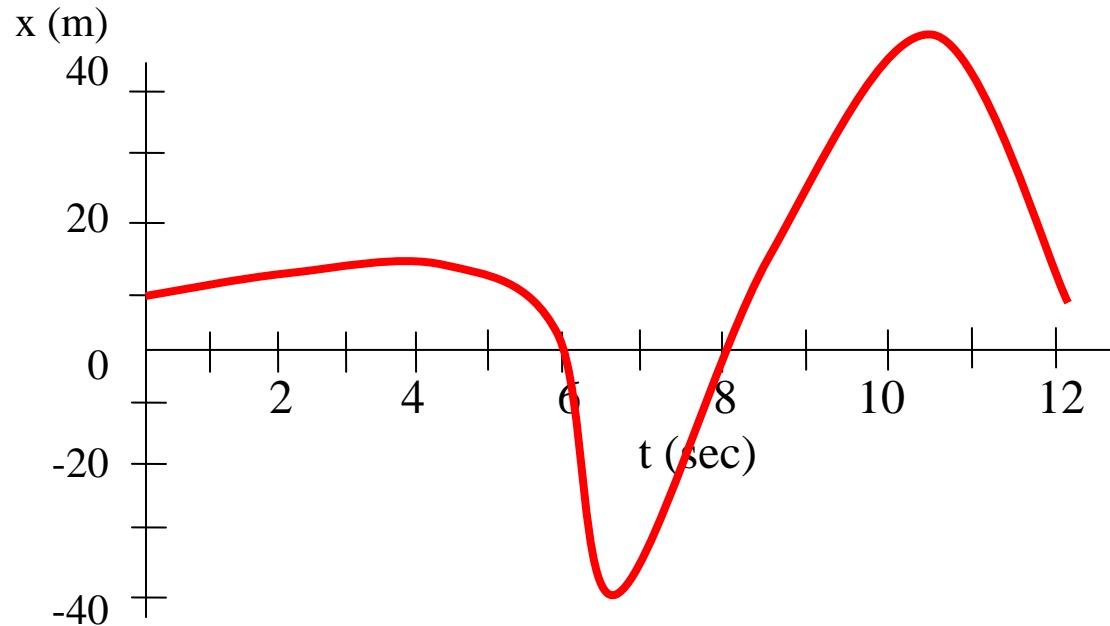


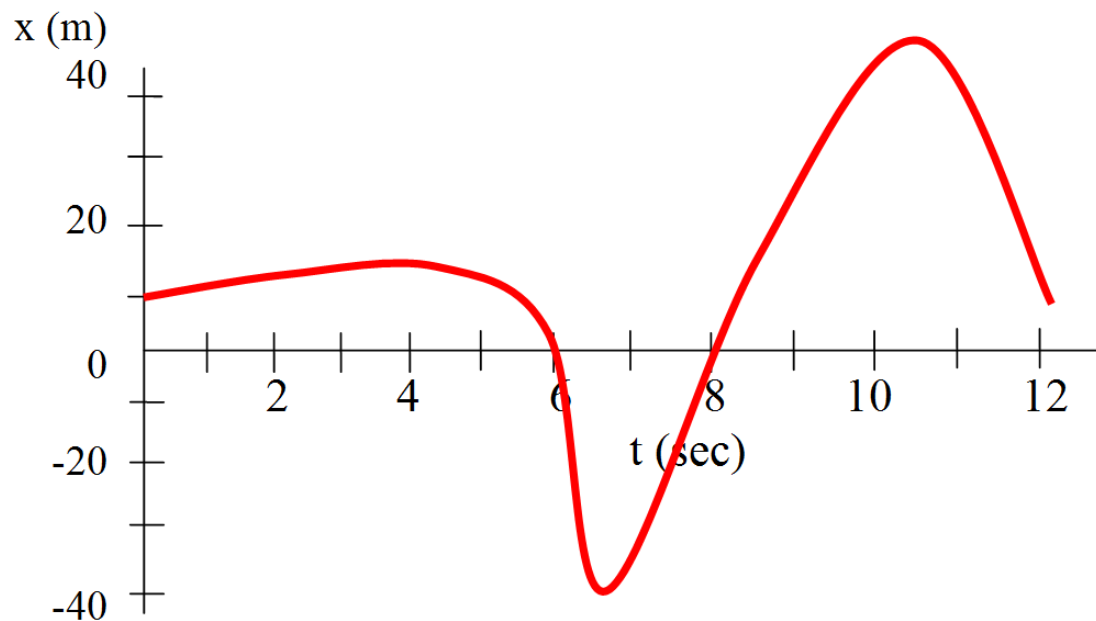
# Instantaneous Velocity

(...at a particular time)

The **instantaneous** velocity at a particular time is the average velocity over a **very small time interval** around that time

= slope of tangent line of the  $x(t)$  graph at that point





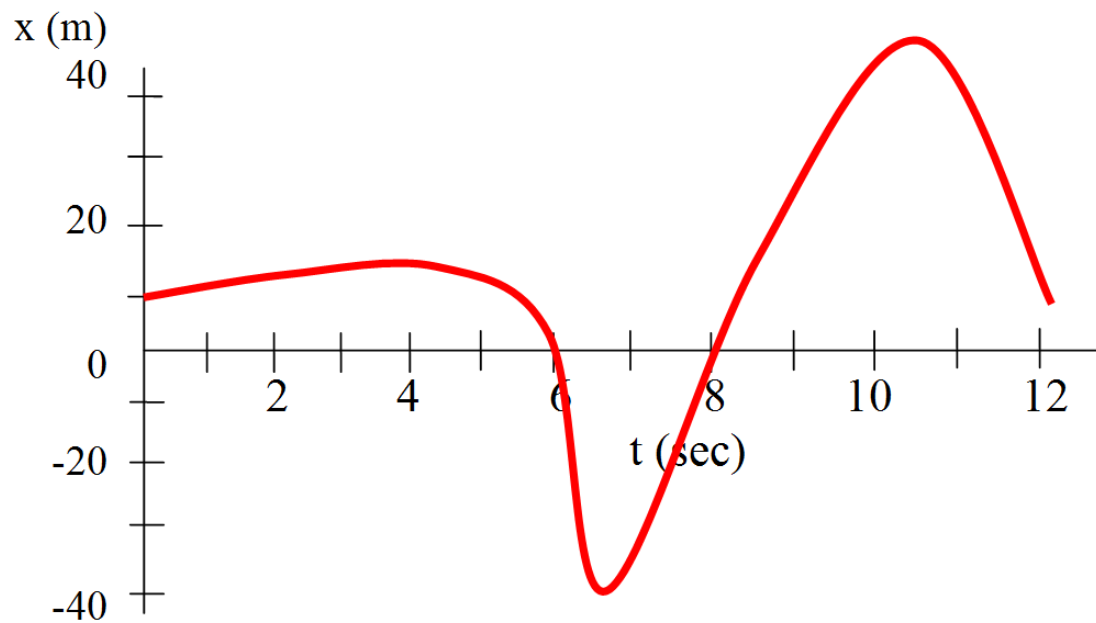
Positive slope means:

Negative slope means:

Zero slope means:

What is  $v_x$  at  $t = 6$  s? (magnitude? direction?)

Where is its fastest speed?



**Clicker quiz:** During its path, the object stops and turns around \_\_\_\_\_ times.

- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

# Summary: What you need to do ASAP

## Should be already done

- Get/download syllabus packet; read the syllabus
- Get textbook
- Get clicker

## Before class on Thursday (due 15 mins before class)

- Do reading assignment (given on Max at start of warmup exercise)
- Do warm-up exercise on Max

## Before Thursday 11:59 pm

- Do first homework assignment on Max, resubmit if necessary

## Reasonably soon

- Get your CID on Max, for use when turning in any hardcopies
- Register clicker on Max

## Optional, but highly recommended

- Form a study group