

Announcements – 2 Sep 2014

1. Welcome to Physics 105! I'm Dr. Colton
2. Opening prayer
 - Prayer sign-up list
3. I send out periodic class-wide emails. Make sure your myBYU email address is current.
4. Answers to two common questions:
 - The Physics 107 Lab is completely separate from this course, since not all of you need to take it. I know very little about it.
 - I'm not using Learning Suite. We have our own class website instead.
5. TA: Jerika McKeon

Introductory Stuff

Class website

Syllabus

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

Class discussion forum

Max

- CID
- Register clicker
- Calendar
- Warmup quizzes (due 15 mins before class, graded on participation only)
- 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
 - Advice for struggling students
 - List of important equations & concepts
 - Forms for you to use to turn in FBDs
- } Read about them on your own!

Pause for questions...

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

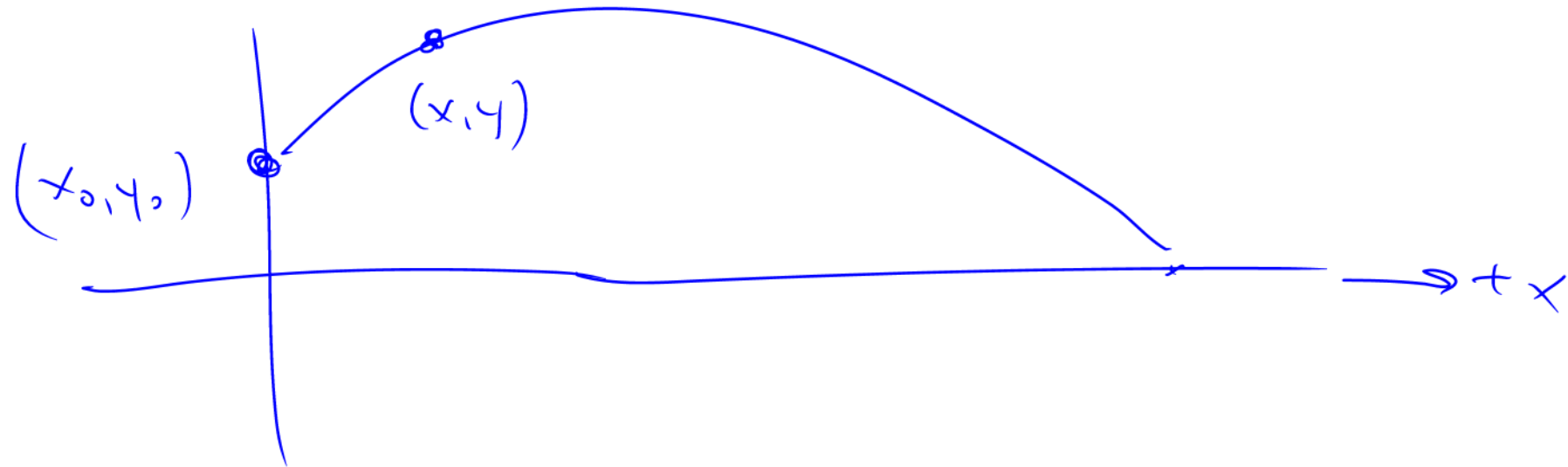
Chapter 1: Units/Trigonometry

- 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.



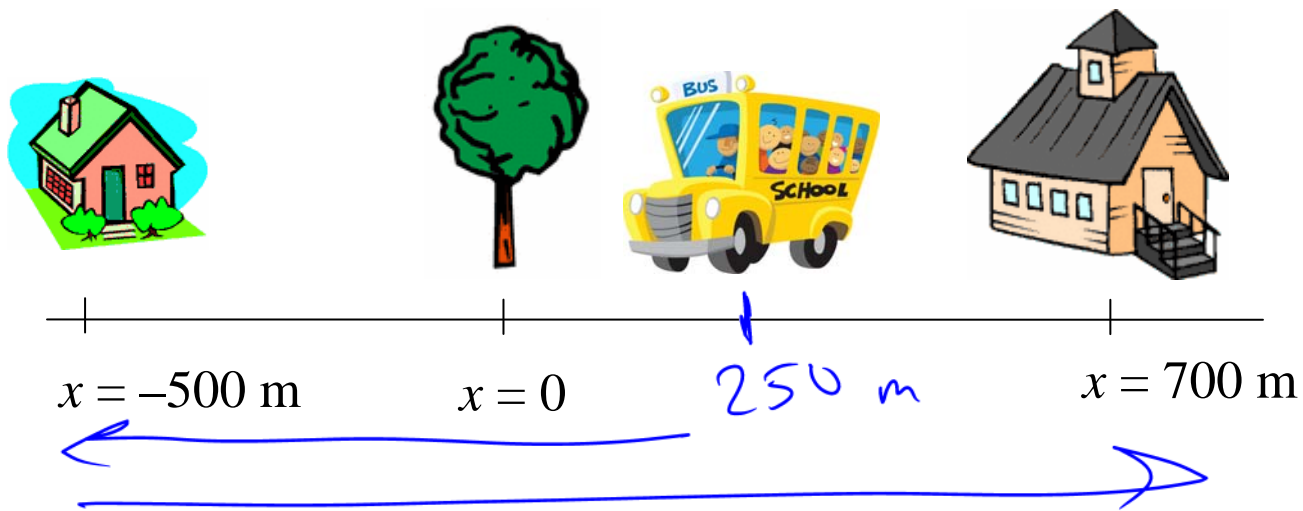
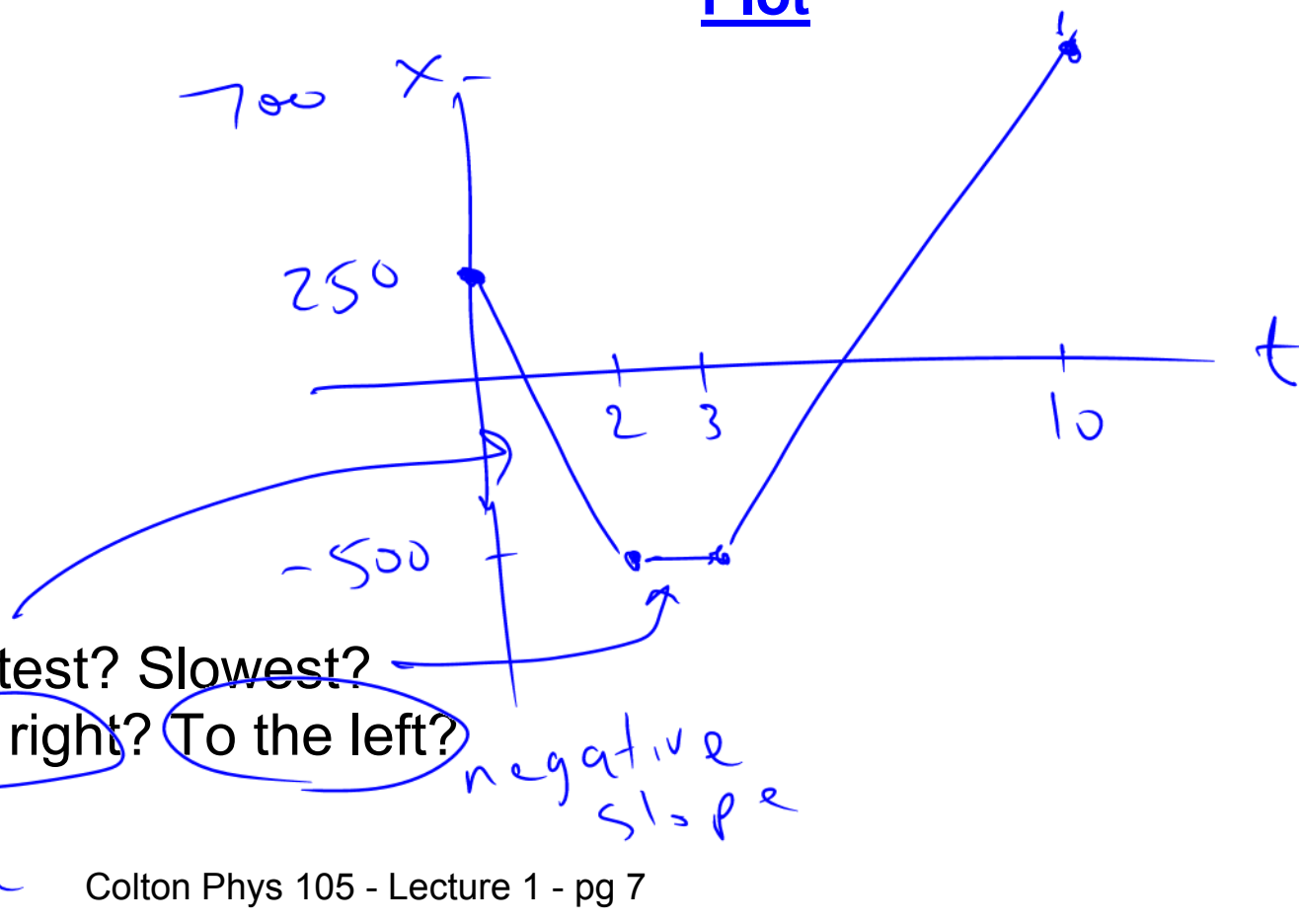


Table: Bus's position

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

Plot



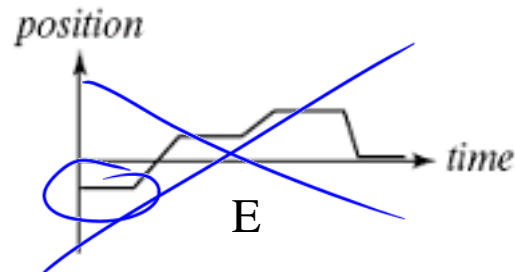
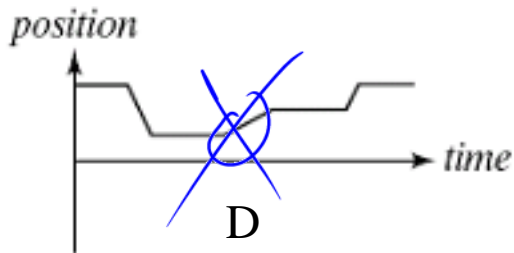
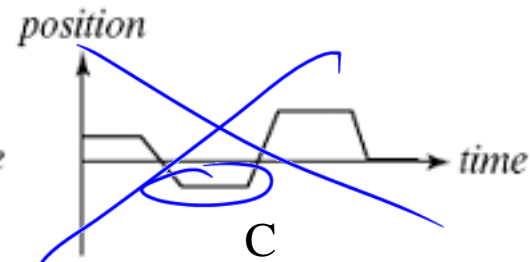
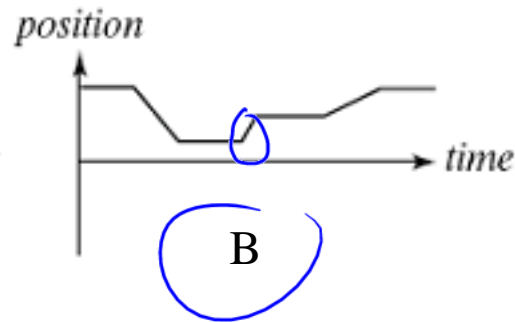
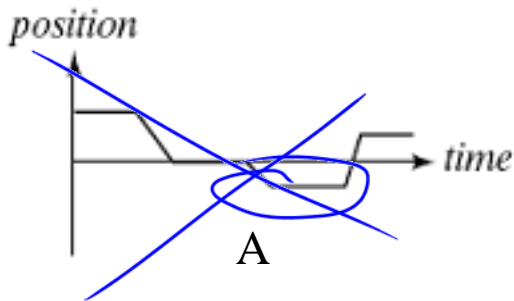
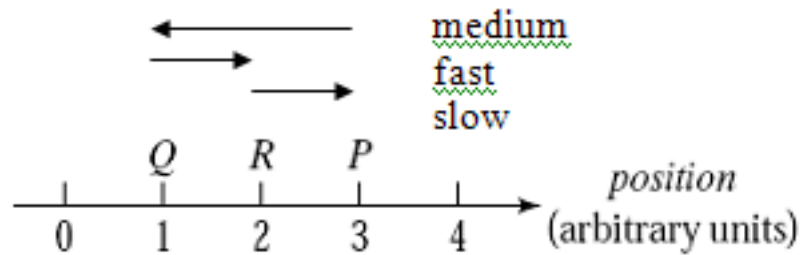
What is the bus doing?

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?

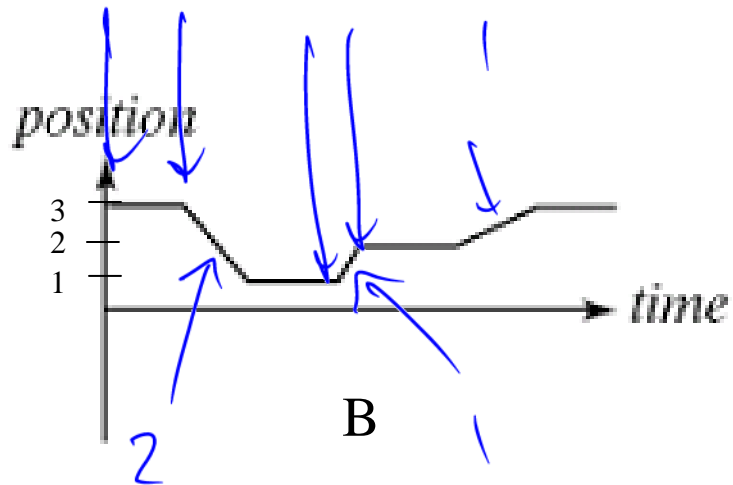
Δx

“Think-pair-share”

- Think about it for a bit
- Talk to your neighbor, find out if he/she thinks the same as you
- Be prepared to share your answer with the class if called on

Clicker: I am now ready to share my answer if randomly selected.

a. Yes



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

Question: what was Nancy's total displacement?

$$\Delta x =$$



Position: where something is located, often labeled by x

Displacement: a change in position, often labeled by Δx

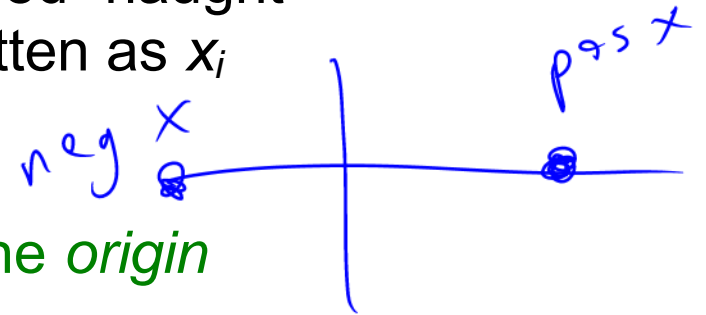
$$\Delta x = x_f - x_0$$

f = final

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

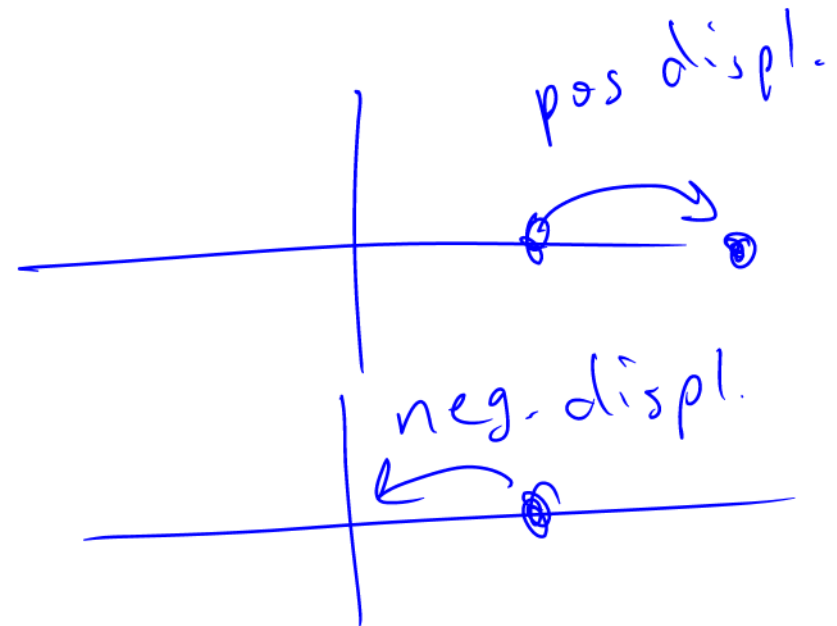
What do we mean by +/- **position**?

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



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

Has *shifted* to the right or left



Velocity

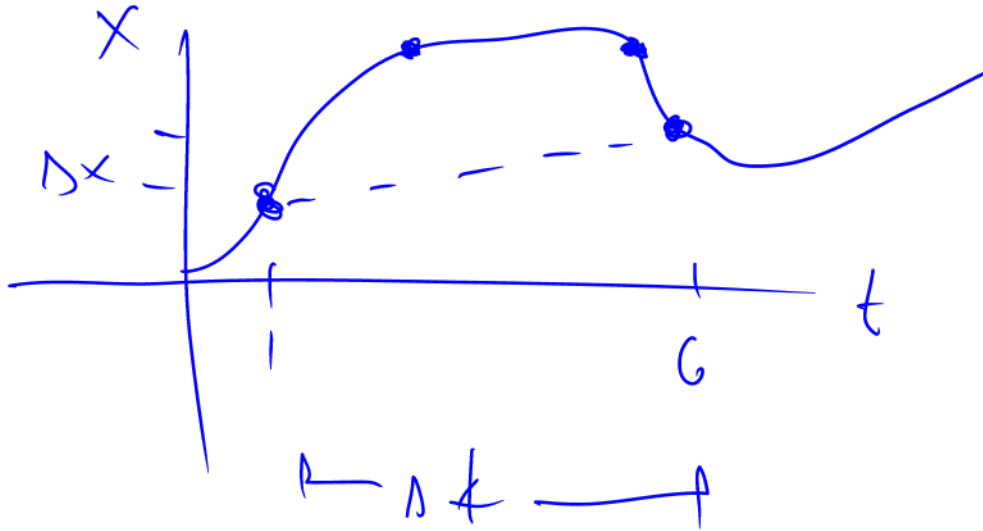
velocity: rate of change of position

average velocity, $v_{ave} = \frac{\Delta x}{\Delta t}$

sometimes written \bar{v} ("v bar")

→ 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.

“Think-pair-share”—I am now ready to share my answer if randomly selected.

a. Yes

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

“Think-pair-share”—I am now ready to share my answer if randomly selected.

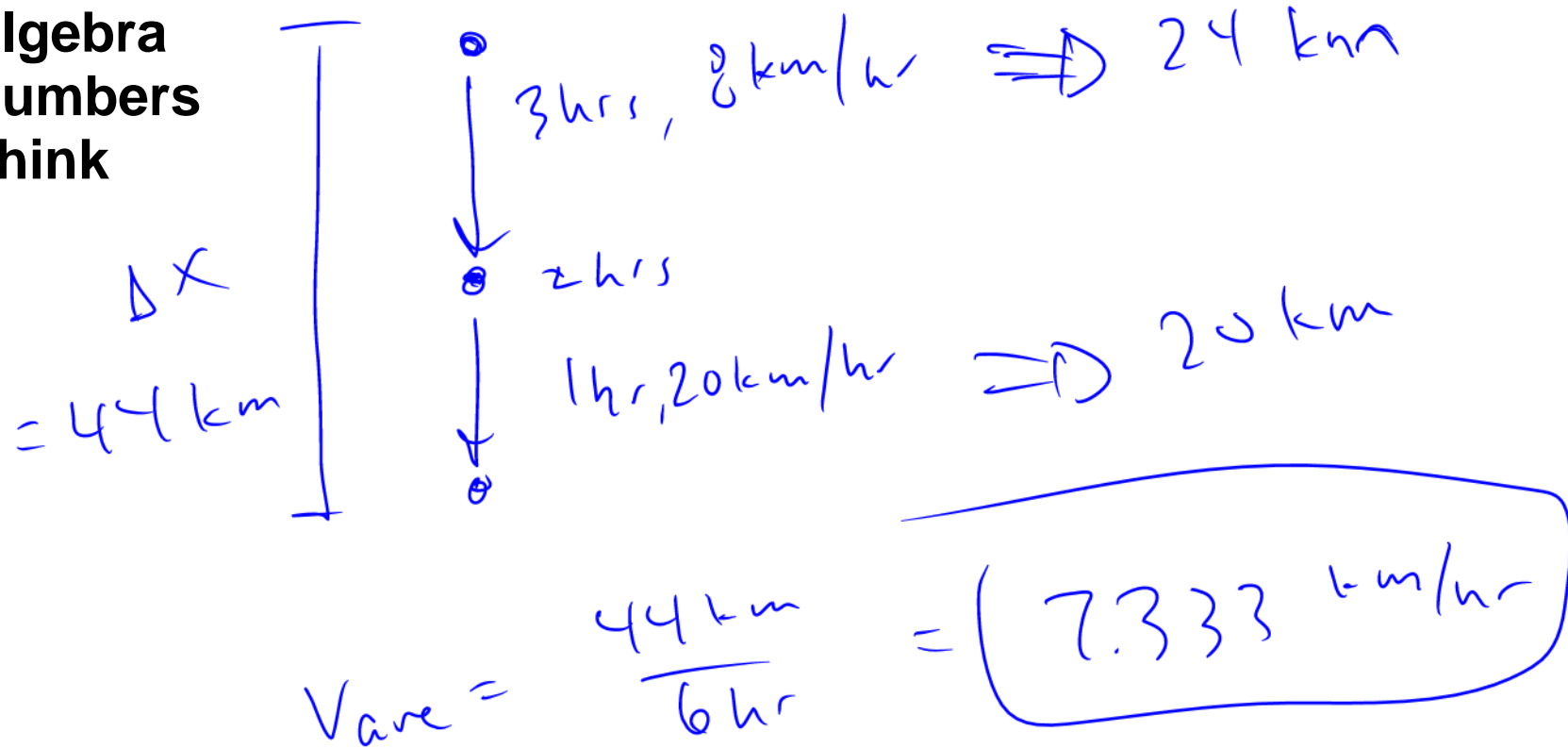
a. Yes

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?

$$V_{ave} = \frac{\Delta x}{\Delta t}$$

From "Problem Solving" section of syllabus: PEANuT

Picture
Equations
Algebra
Numbers
Think

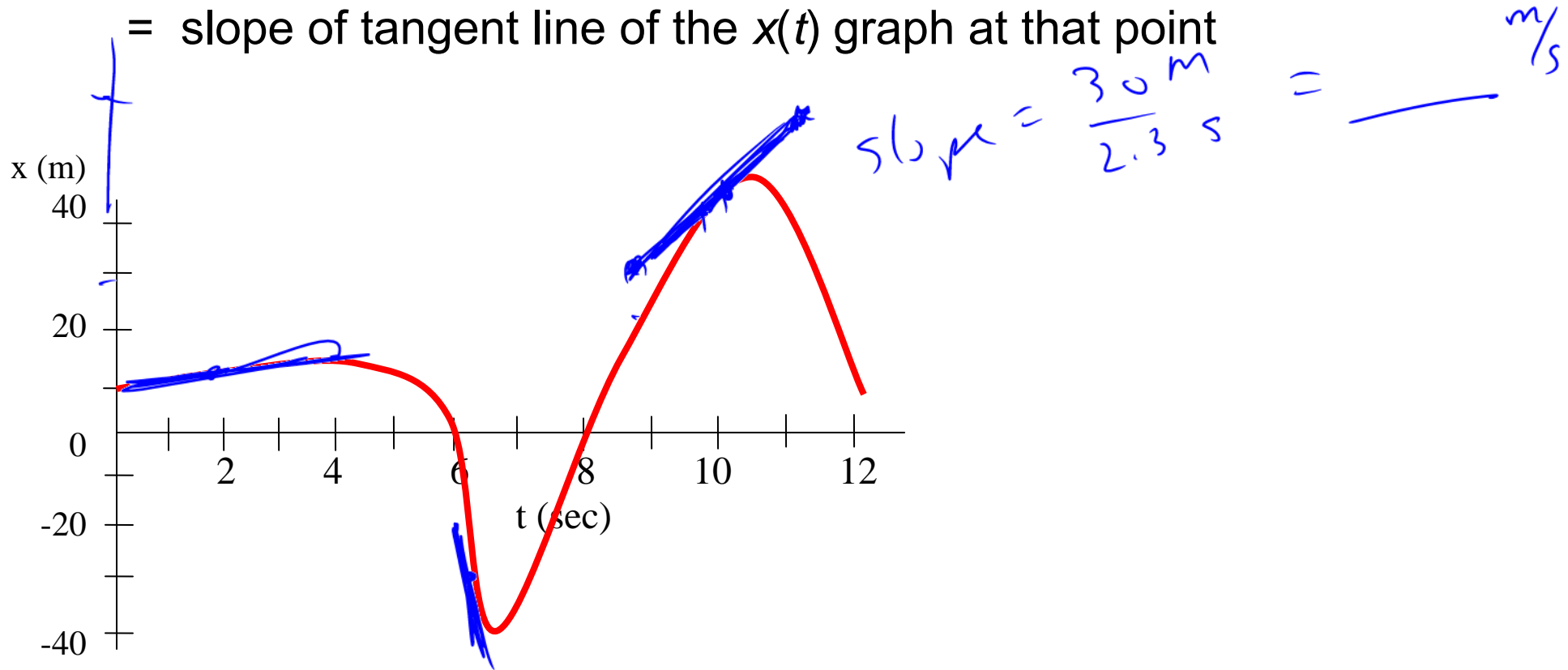


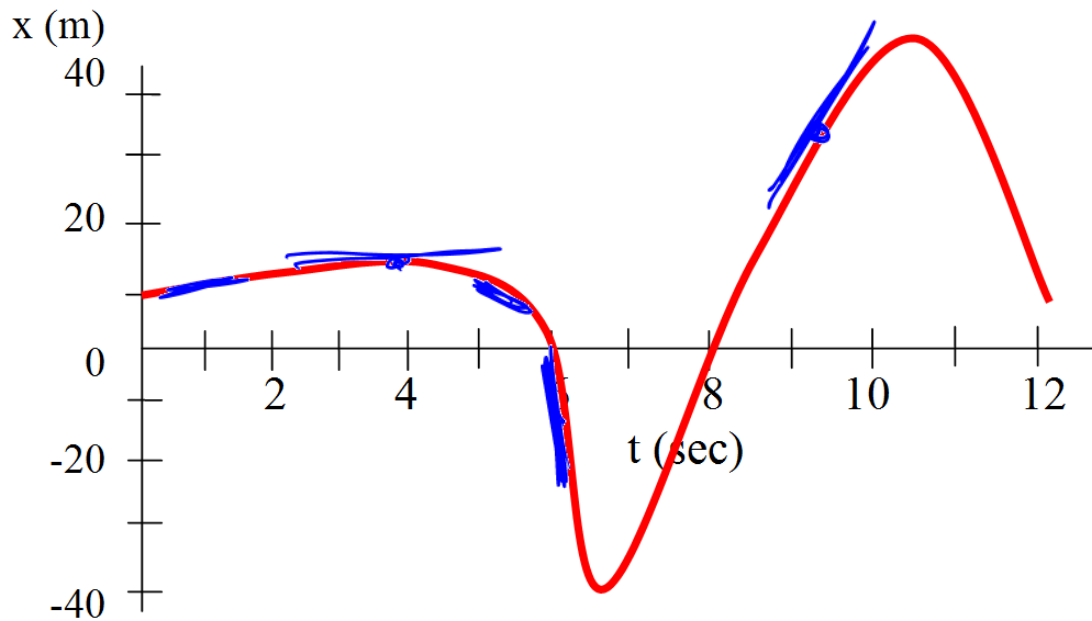
Instantaneous Velocity

(...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:

to the right

Negative slope means:

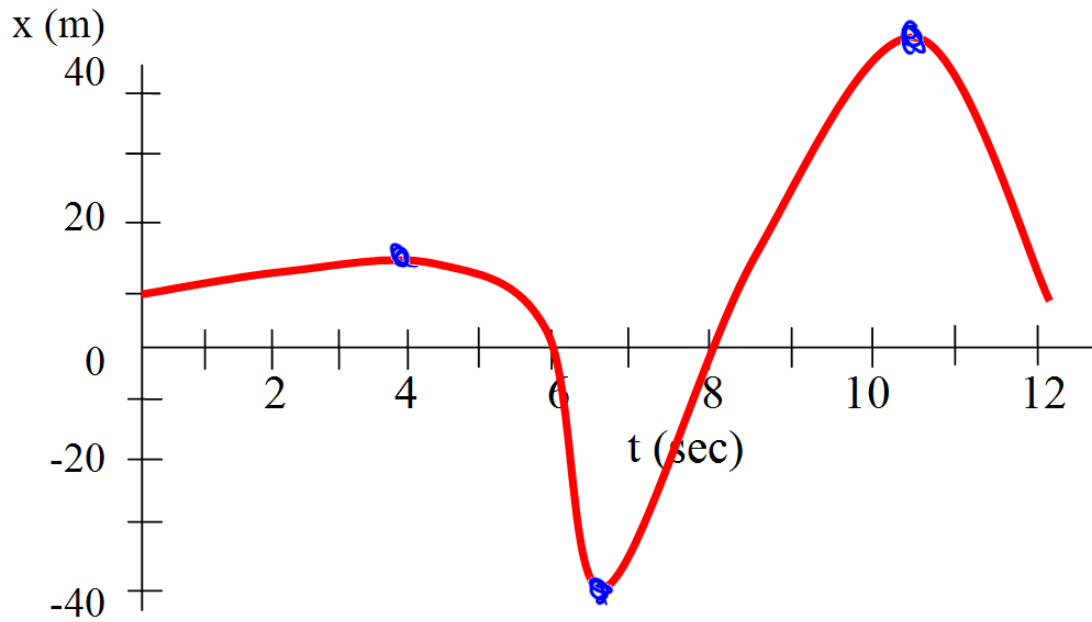
" " left

Zero slope means:

stopped

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 | b. 1 |
| b | c. 2 |
| c | d. 3 |
| d | e. 4 |
| e | f. 5 |

Summary: What you need to do ASAP

Should be already done

- Get/download syllabus packet; read the syllabus
- Get textbook & clicker
- Do today's reading assignment

Before Wednesday 11:59 pm

- Do first homework assignment on Max (short)

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

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, use the discussion forum to find people if needed