Announcements 2 Feb 09

- PRS
  - Start using PRS clickers on Wednesday
- Blog posts: http://blogs.umass.edu/physics131-willocq
  - You need to log to post a comment (use "Blog log in" link)
  - I will need to authorize your comments
- *TO DO by tomorrow morning* (8 am on Feb 3)
  - Complete the "Introduction to MasteringCollegePhysics" homework assignment
  - This assignment does not count toward your grade but is necessary to get acquainted with MasteringPhysics web-based homework system
- *Hmwk #1 due Friday morning* (8 am on Feb 6)

Homework

- Homework #1 due on Friday
- Consists of two components:
  - *Online homework* via http://www.masteringphysics.com due on Friday by 8 am
  - *Written homework* (1 problem, see blog) due on Friday at the start of lecture
- Post questions as comment to blog posts

Online Homework

- Remember to use "*" for multiplication:
  6 x 10^-12 NOT OK
  6 * 10^-12 OK
- Number of significant figures = 3 most of the time
  --> may need rounding up or down
  --> but sometimes you are required to provide only 2 sig figs
  e.g. a value like 1.2631 m/s should be entered as
  - 1.3 m/s if 2 sig figs are required
  - 1.26 m/s if 3 sig figs (default)
- This matters because of the 2% tolerance on marking a numerical answer as correct
- Grading: +2% for unopened hint (per question)
  -0% for each incorrect numerical answer
  -10% for ea. incorrect multiple choice answer
  max #attempts = 20
- Deadline:credit drops to 50% after 24 hours (beyond 8 am deadline)
  --> late submissions accepted, don't give up by requesting answer

Written Homework

Written homework to be turned in at the start of lecture on the due date

- Submit handwritten solution to one problem (on a sheet of paper)
- Grading
  - 2 points
  - important to see your work, as important as final answer(s)
- Deadline
  - Late submissions are accepted for half credit
  - No submission once the solution is posted (~a few days after due date)

Question about magnitude of numbers

PRS

Which of the following two numbers is larger?

A. 4×10^6

B. 6×10^4

How much larger?

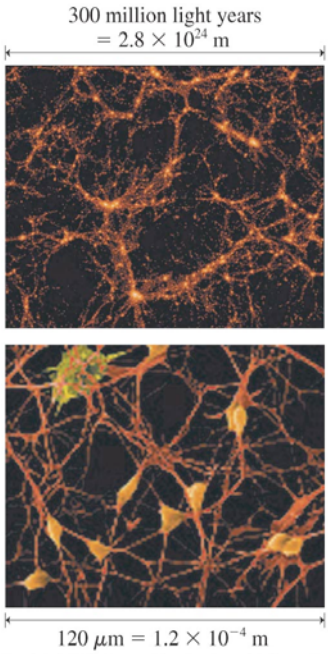
Read Ch 1 Sec 4 for units, unit conversions, significant figures, scientific notation, etc.
➔ homework #1

Powers of 10

Describing our Universe requires the use of vastly different numbers

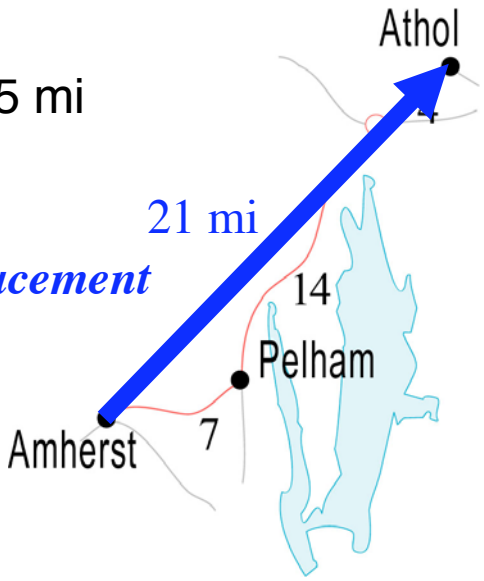
Simulation of the large scale structure of the Universe

Cortical nerve cells



Motion in two dimensions

Distance = 25 mi

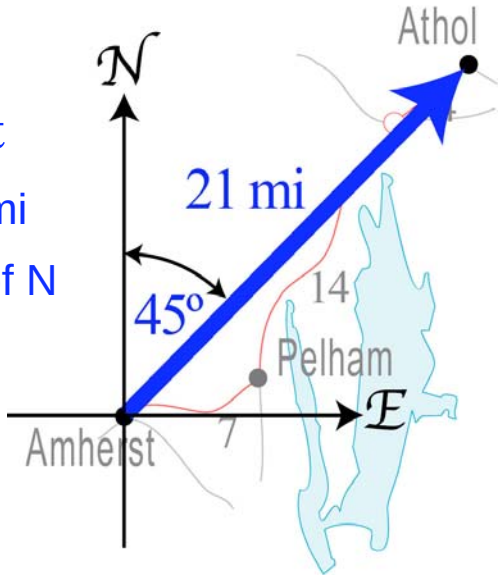


Motion in two dimensions

Displacement

Magnitude = 21 mi

Direction = 45º E of N or NE



Motion in two dimensions

Magnitude only, depends on path

Distance is a "**SCALAR**" quantity

Displacement is a "**VECTOR**" quantity

Magnitude plus direction, depends only on initial and final locations

Scalar OR Vector?

Distance?	*S*
Displacement?	*V*
Speed?	*S*
Velocity?	*V*
Mass?	*S*
Time?	*S*
Energy?	*S*
Momentum?	*V*

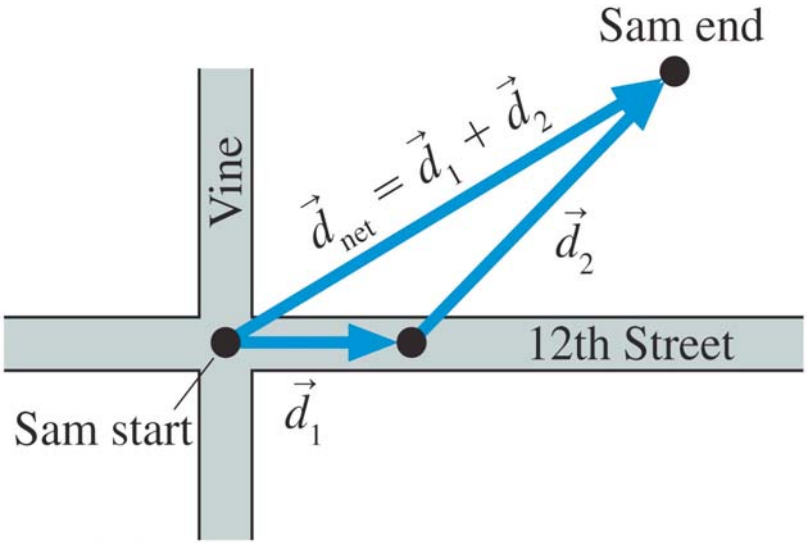
Vectors and Motion

A quantity that requires both a magnitude (or size) and a direction can be represented by a *vector*. Graphically, we represent a vector by an arrow.

The velocity of this car is **100 m/s** (magnitude) to the **left** (direction).

This boy pushes on his friend with a force of **25 N** to the **right**.

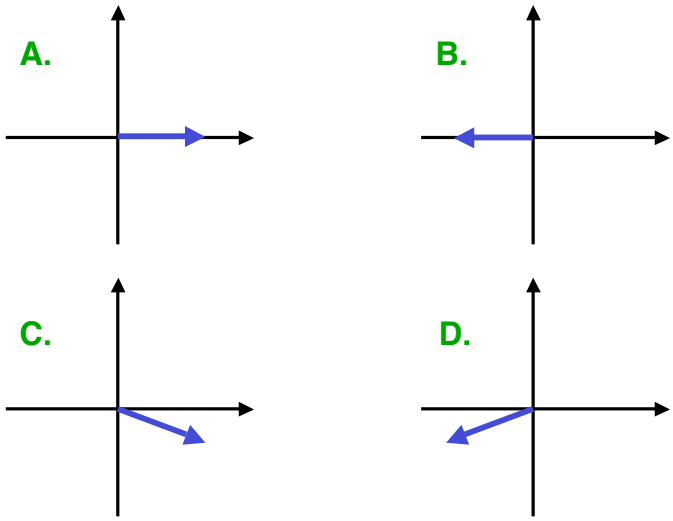
Adding Displacement Vectors



Example: Adding Displacement Vectors

PRS

Jenny runs 1 mi to the northeast, then 1 mi south.
Graphically find her **net displacement**.

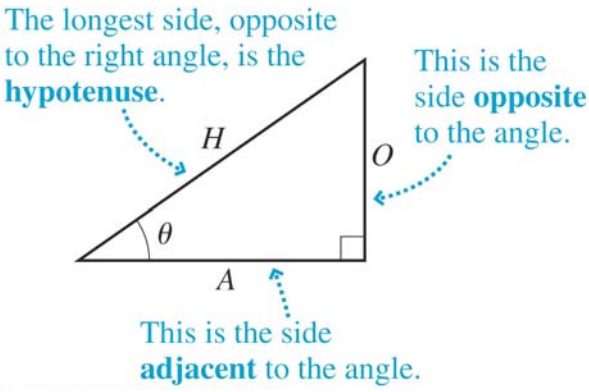


Trigonometry reminder: "*SOHCAHTOA*"

$$\sin\theta = \frac{O}{H}$$

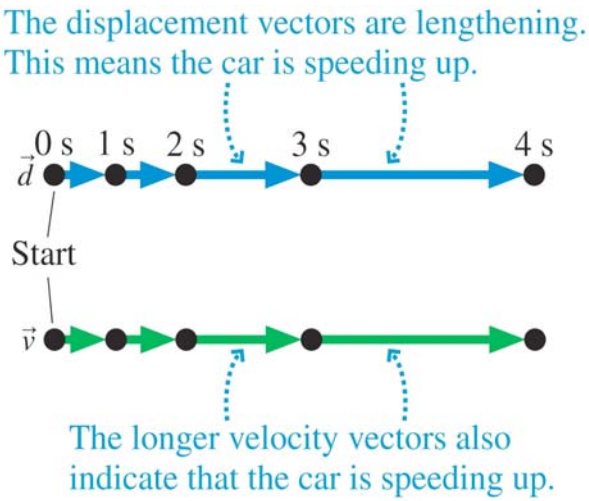
$$\cos\theta = \frac{A}{H}$$

$$\tan\theta = \frac{O}{A}$$



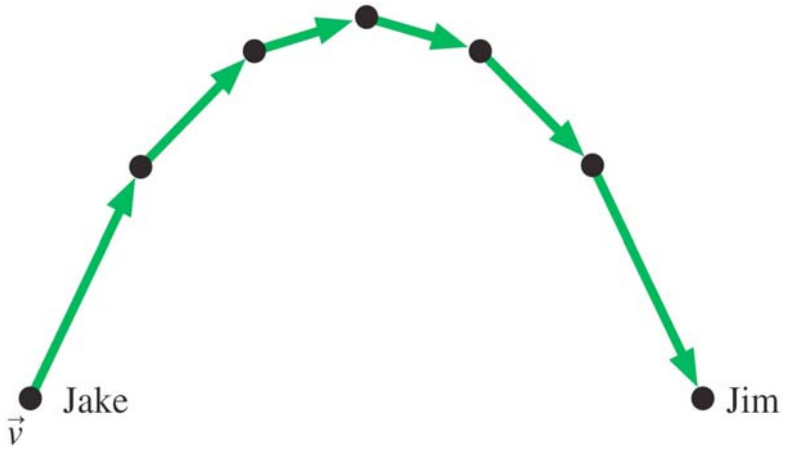
To determine the x- and y-axis components of a vector it is useful to remember "SOH CAH TOA"
For example, the x-axis component would be $A = H \cos\theta$

Velocity Vectors



Example: Velocity Vectors

Jake throws a ball at a 60° angle, measured from the horizontal. The ball is caught by Jim. Draw a motion diagram of the ball with velocity vectors.



Units

Units

Every measurement of a quantity must include a unit.

The standard system of units used in science is the SI system. Common SI units include:

- Length: meters (m)
- Time: seconds (s)
- Mass: kilograms (kg)

- Some advantages of metric (SI) system over British system:
  - 1 km = 1000 m but 1 mi = 5280 ft
  - In international use