Phys 2110 8/31/11

Note Title 8/31/2011

Topics for Semester

Mechanics (Motion)

- Kinematics (Only motion)
- Dynamics (Reasons for motion, forces)
  - Newton's Laws
- Energy, Momentum
- Rotional Motion

Oscillations
Wave motions

Omit: Gravity
Fluids
Thermal Physics

2nd Semester Electricity
Magnetism
Light

350e-3

Chap 1

Sci Notation

Scientific Numbers: $0.00350 = 3.50 \times 10^{-3}$

Physics is about measurements.

MKS (SI) m, kg, s

1 m ~ 1 yd 1 ft = 0.3048 m

Prefixes

10^{6}	Mega	M	10^{-9}	nano	n
10^{3}	kilo	k	10^{-12}	pico	p
10^{-2}	centi	c			
10^{-3}	milli	m			
10^{-6}	micro	μ			

Converting units

0.3048 m = 1 ft

"Multiply by 1 method.

$$(2717\ \text{ft})\left(\frac{0.3048\ \text{m}}{1\ \text{ft}}\right) = 828.1\ \text{m}$$

Change $70\ \frac{\text{mi}}{\text{hr}}$ to $\frac{\text{m}}{\text{s}}$

$$(70.0\ \tfrac{\text{mi}}{\text{hr}})\left(\frac{1\ \text{hr}}{3600\ \text{s}}\right)\left(\frac{1.609\ \text{km}}{1\ \text{mi}}\right)\left(\frac{10^3\ \text{m}}{1\ \text{km}}\right) = 31.3\ \tfrac{\text{m}}{\text{s}}$$

$$\left(2.71\ \frac{g}{cm^3}\right)\left(\frac{1\ kg}{10^3\ g}\right)\left(\frac{100\ cm}{1\ m}\right)^3 = 2710\ \frac{kg}{m^3}$$

$$= 2.71 \times 10^3\ \frac{kg}{m^3}$$

Density of Al

kg/m^3

Sci meas's have uncertainties ("errors")

In labs "Error analysis"

Significant figures (known)

$3.250 \neq 3.25$

$(3.25)(8.7) = 2.8275 = 2.8$

3 known figs — 2 known figs

$(3.10 \times 10^{-15})(4.678 \times 10^{-5}) = 1.45 \times 10^{19}$

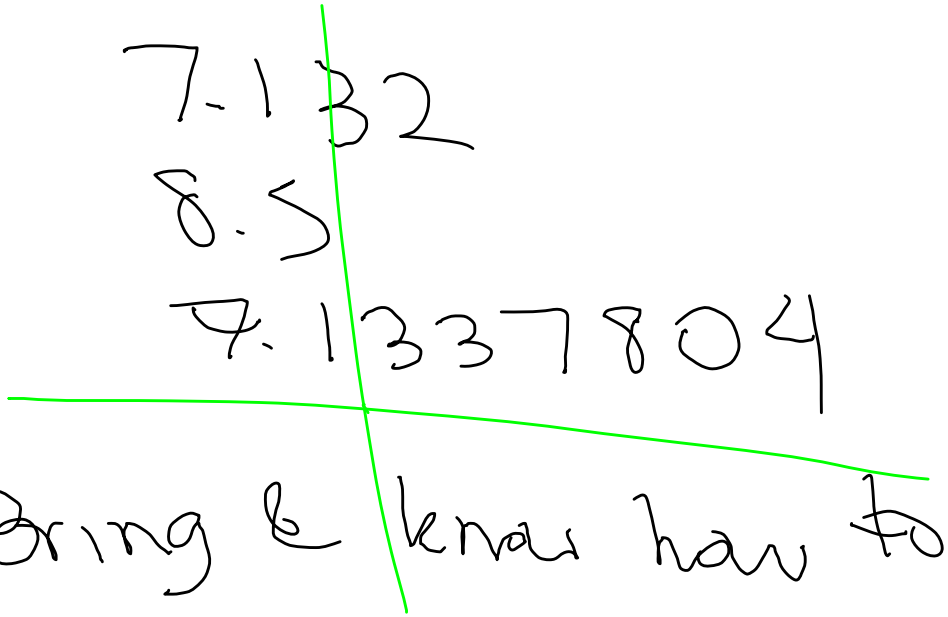
3 figs — 4 figs

When adding, round to decimal place of the worst-known number

7.132

8.5

7.1337804



Bring & know how to work your calc.

Problem Solving

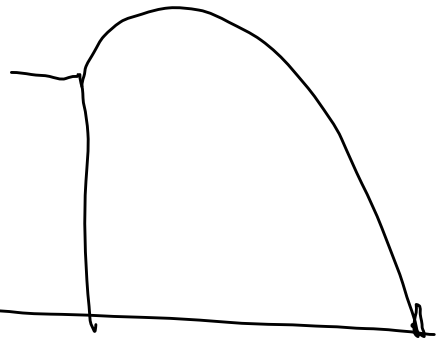
Read problem carefully

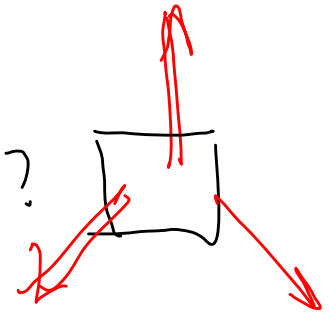
Draw a diagram.

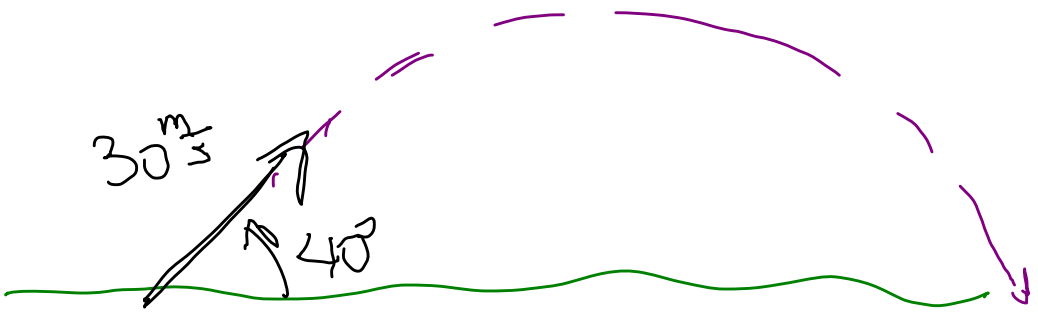
Choose right equations

Solve them.

Get answer: Is it plausible?







11 min

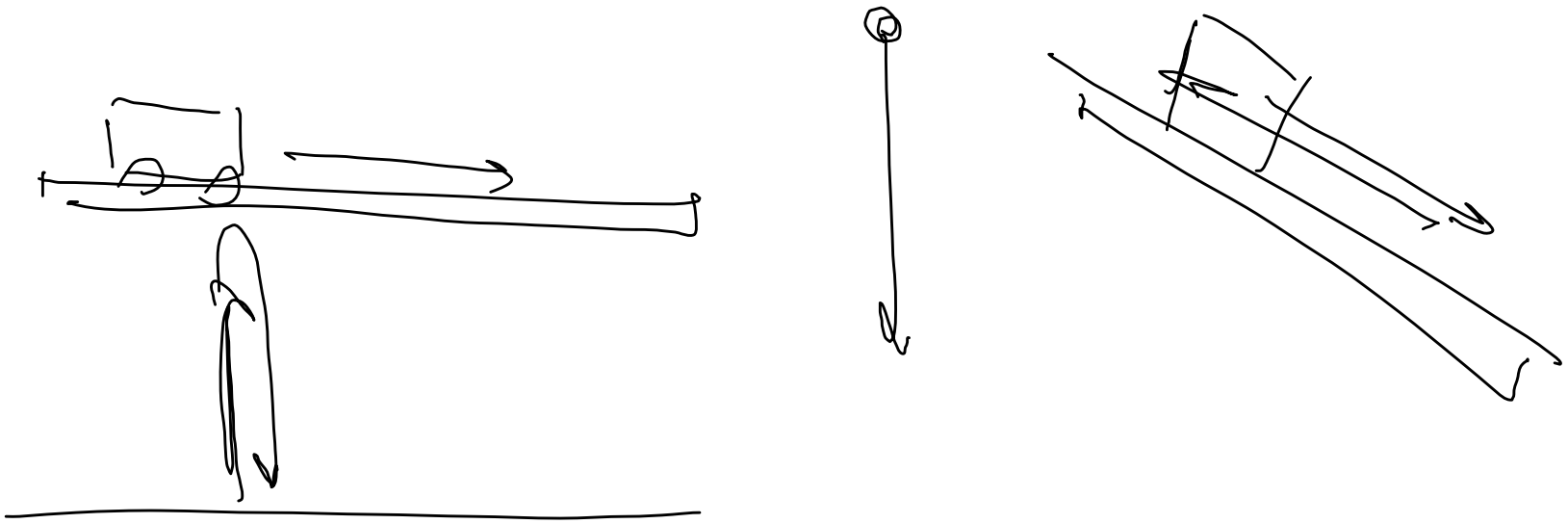
How long it spend in air?

0.004 s

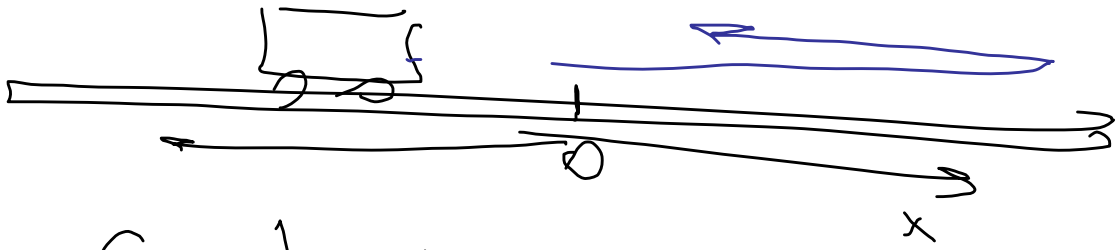
5×10^{6} s

Chap 2 Motion (Math, Kinematics)

Motion in One Dimension

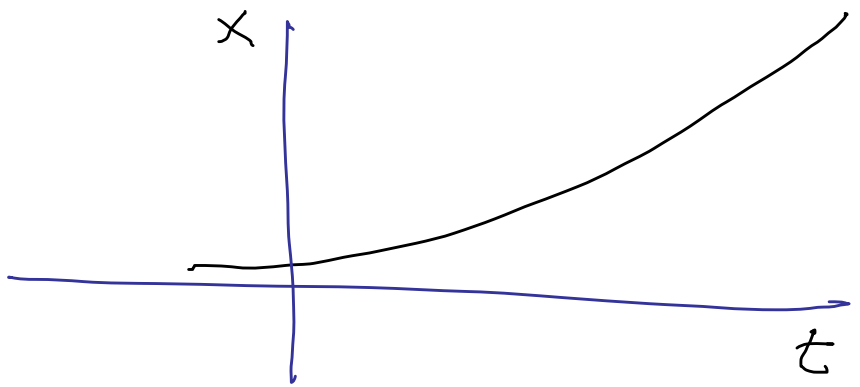


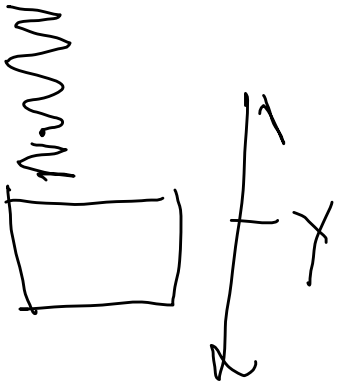
Coordinate system

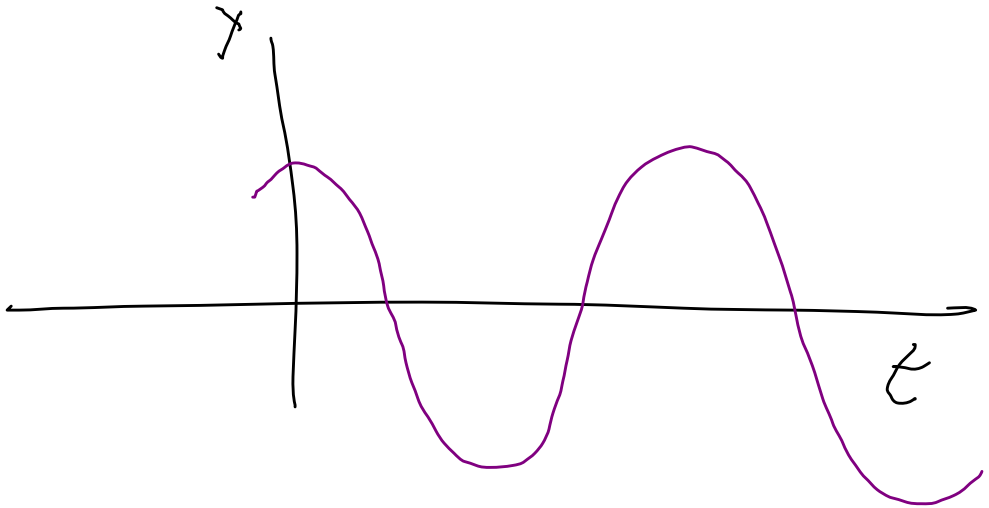


Coordinate is X, x changes with time

$x(t)$

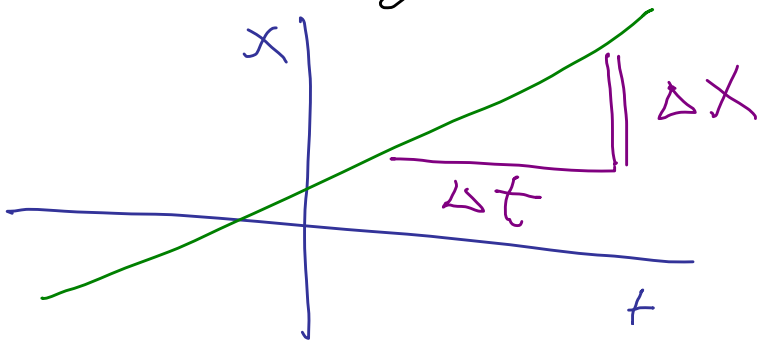


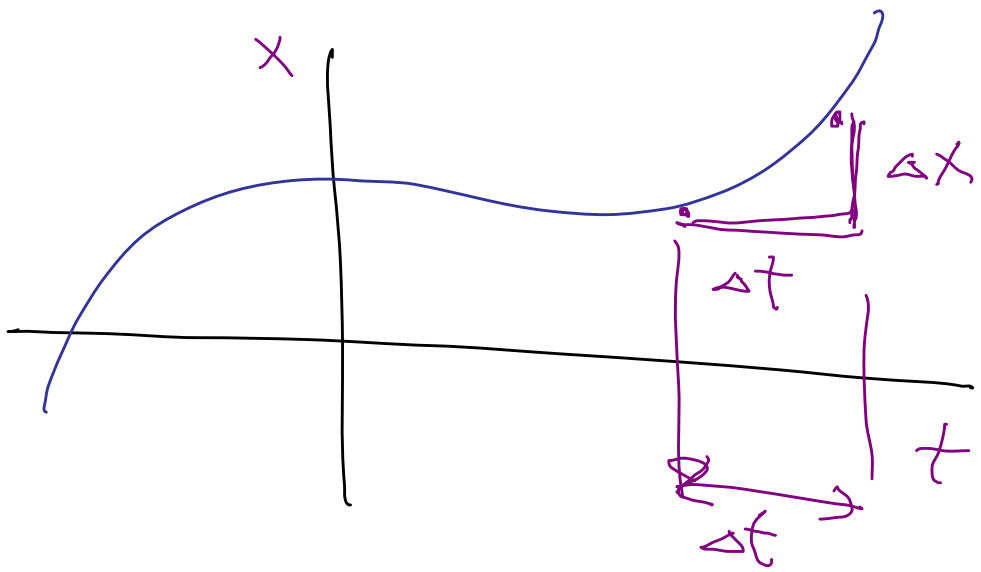




Analyze

How rapidly does x change with time?





For a given interval

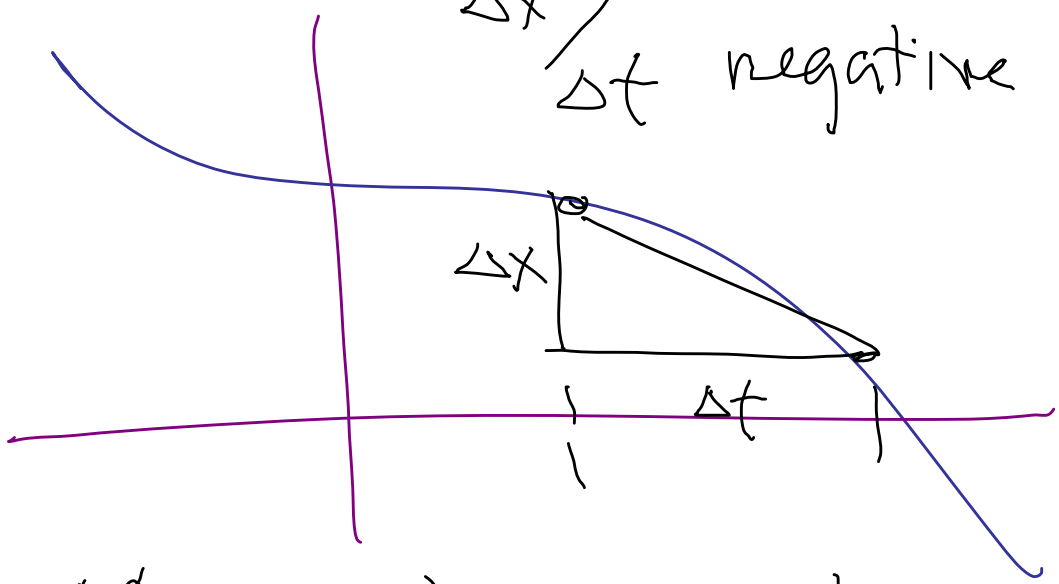
$$\bar{v} = \frac{\Delta x}{\Delta t}$$

Average velocity for interval.

$\bar{v}$ has units of m/s

$\Delta x / \Delta t$ negative

Avg Speed $= \left| \frac{\Delta x}{\Delta t} \right|$



More interested in:

How fast it going right now?