Phys 2110-5 8/29/12

Note Title 8/29/2012

Chap 1 Doing Physics

Topics: Mechanics — How things move.

Kinematics: Study of motion

Dynamics: Reasons for motion — forces

Energy, Momentum — Netwon's Laws

Rotational Motion.

Oscillations.

Waves → End Dec 11 ?

Electricity & Mag & Light

Basic Tools: Sci. Numbers etc.

Measurements

Sci Notation: $0.00032 = 3.2 \times 10^{-4}$

3.2e-4

HW system 3.2 * 10^-4

Units

MKS, SI

Basic units

Length, m 1 meter ≈ 39 in

Mass kg 1 kg of mass ⇔ 2.2 lb weight

Time s second

Use prefixes to save some writing:

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

Convert units

Need conversion

1 ft = 0.3048 m

1 mi = 1.609 km

"Multiply by 1 method"

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

Use this!

Convert $70.0 \frac{mi}{hr}$ to $\frac{m}{s}$

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

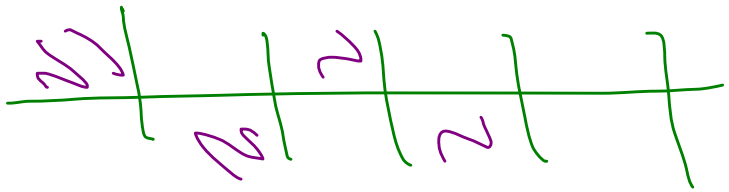
$$= \boxed{31.3 \frac{m}{s}}$$

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

$(100\ cm) = (1\ m)$ $\quad 100\ cm^3 = 1\ m^3$ Not true !!

$1\ in = 2.54\ cm$

Engineering



Sci. Measurements have uncertainties.

$3.25 \neq 3.250$

3 known 2 known

$(3.25)(8.7) = 2.8275 \approx \boxed{2.8}$

Answer can only have 2 figures

Count the # known figures.

$\left(\frac{1.0}{3.0}\right) = 0.33333\ldots$

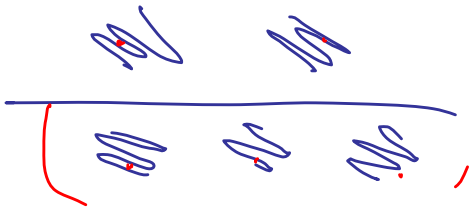
$= 0.\overline{3}$ Wrong

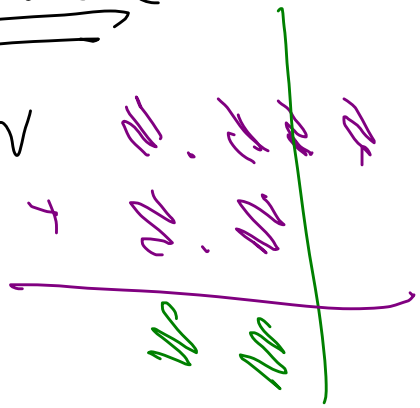
$= 0.33$

Adding & subtract

Round the answer to decimal place

of the worst-known number





Real

Problem Solving

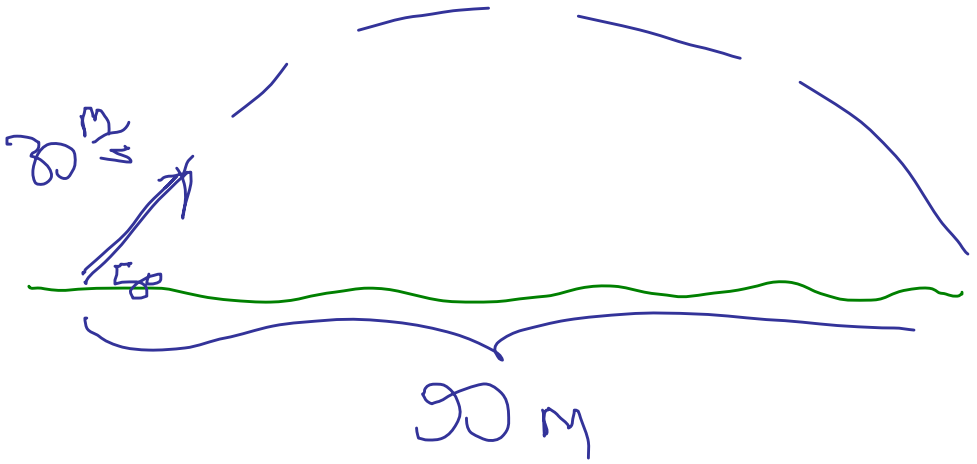
0) Panic phys's imp.

1) Read, visualize

2) Draw a picture

3) Find relevant equations, solve the equations

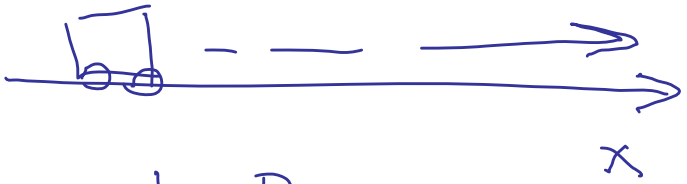
4) Check answer — Units, Plausible



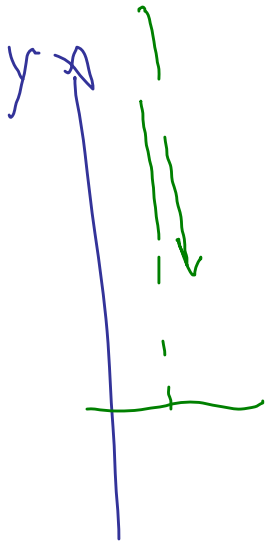
How long in air?

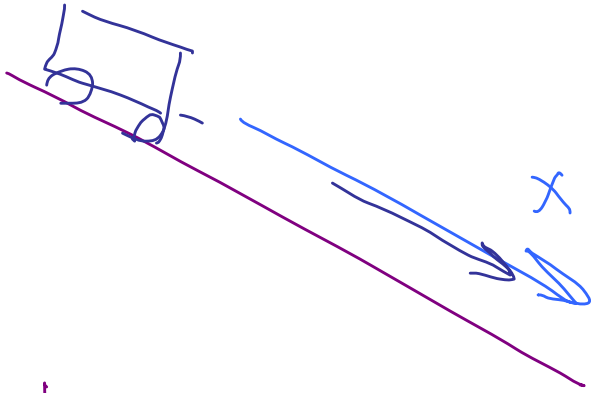
11 min

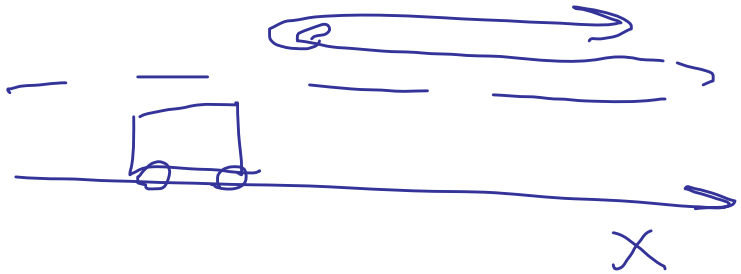
Ch 2 Motion in 1-Dim

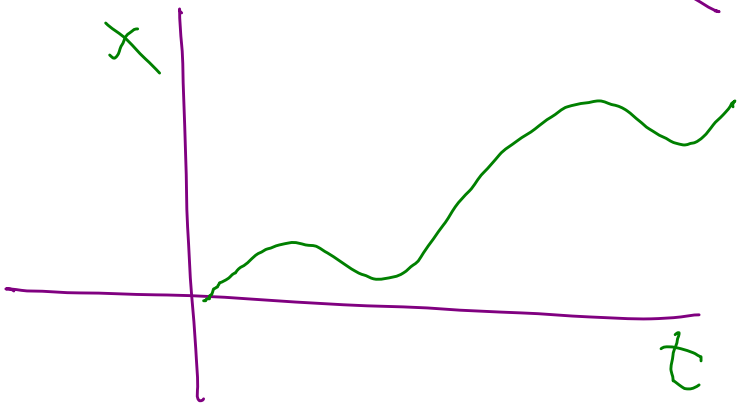


1-Dim motion

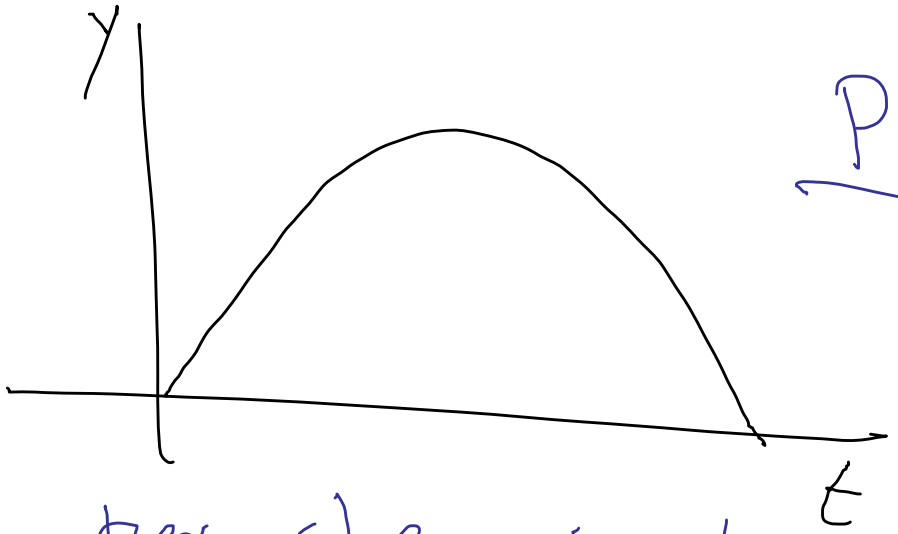






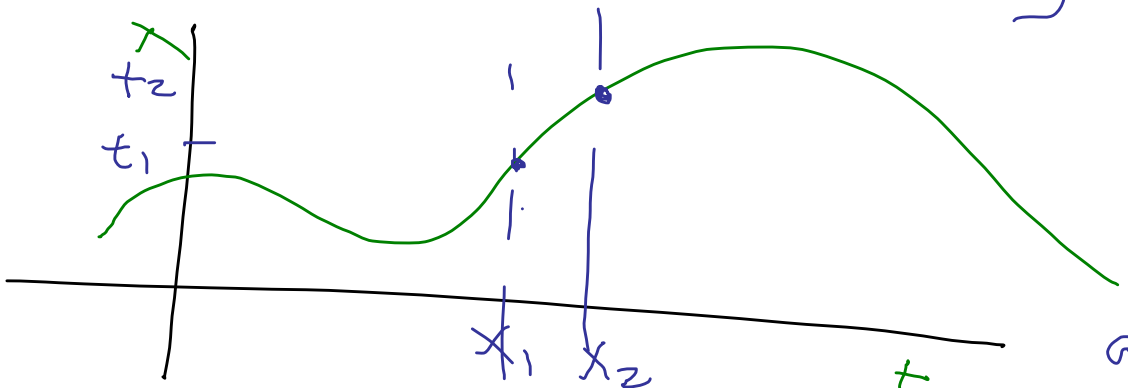


Coord system x in meters



particle

Change in x per change in t.



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

$$= \frac{x_2 - x_1}{t_2 - t_1}$$

average velocity