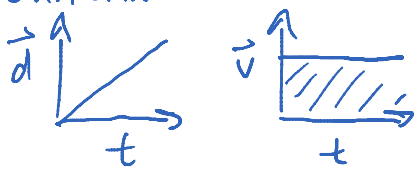
Physics Topics

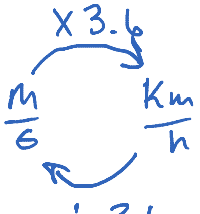
Tuesday, January 13, 2015
2:35 PM

Uniform motion



$\vec{v} = \frac{\vec{d}}{t}$

$\vec{v}_{Average} = \frac{\vec{d}_{total}}{t_{total}}$



Sig digs:

5 sig digs

0.0012300

Leading zeros not significant

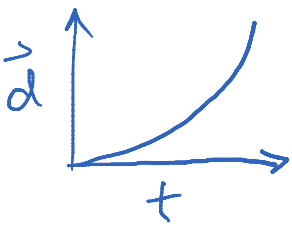
Non-zeros signi-ficant

Trailing zeros signif-icant

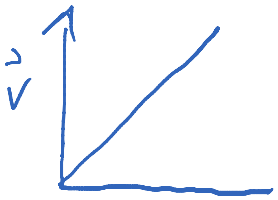
Tape

Accelerated Motion

speeding up



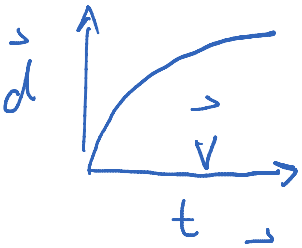
positive slope



$\vec{a} = \frac{V_f - V_i}{t}$

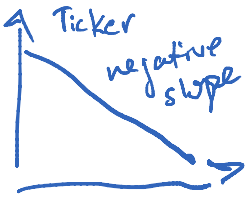
$at + V_i = V_f$

$\frac{V_f - V_i}{a} = t$



slope = $\vec{v}$

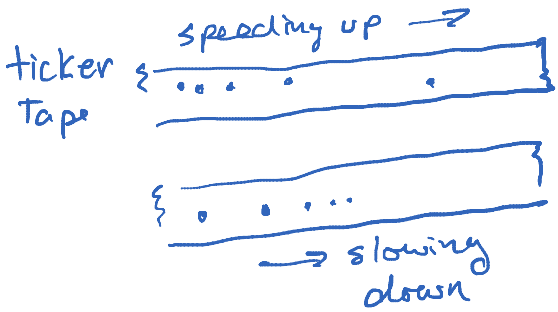
$\text{Slope} = \frac{Y_2 - Y_1}{X_2 - X_1}$



slope = $\vec{a}$

area = $\vec{d}$

FREEFALL



Energy AND Work AND Gravity

$W = Fd$

$W = \Delta E$

$E_K = \frac{1}{2}mv^2$

$E_p = mgh$

$\therefore v = \sqrt{\frac{2E_K}{m}}$

W = work (J) or (N·m)

ΔE = change in energy (J)

E_K = Kinetic energy (J)

E_p = gravitational potential energy (J)

g = acceleration due to gravity (9.81 m/s^2)

$F_g = mg$ — 9.81 m/s^2

weight (N) mass (kg)

FIRST Law of thermodynamics

- Energy is not created or destroyed

$\Sigma E_{IN} = \Sigma E_{OUT}$

Sum

ALSO $W = \Delta E$

ΣE = total energy ... CALLED the MECHANICAL ENERGY

2nd Law of Thermodynamics:

2nd Law of Thermodynamics: ... CALLED the SUM MECHANICAL ENERGY

- Some energy is always lost as heat, sound, etc
- efficiency is always less than 100%

$$\%\ \text{efficiency} = \frac{\text{output E}}{\text{input E}} \times 100\%$$

Heat Transfers

- History of the steam engine
- $Q = mc\Delta t$

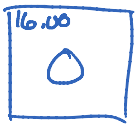
Heat (J) ↑ GRAMS!

$$H_{fus} = \frac{Q}{n} \quad (Q \text{ in KJ})$$

$$H_{vap} = \frac{Q}{n} \quad (Q \text{ in KJ})$$

Look up molar masses on Periodic Table

M (g/mol)



moles (mol) → $n = \frac{m}{M}$ ← mass (g), ← molar mass g/mol

Na_2CO_3