

PHYS 2010 LECTURE 13

Where are we?

Introduced Newton's 3 laws:

$$\vec{F}_{\text{net}} = m\vec{a} \quad (\text{I, II})$$

Equal, opposite forces btw 2 objects (III)

Note: these are laws: you can treat them as assumptions of Newtonian mechanics. No exceptions! (We can say this only because of 400 years of experimental evidence.)

A formula, however, like

$$x = \frac{1}{2}at^2$$

is not a law, because it only applies in certain circumstances:

Acceleration must be constant

v, x must be zero at $t=0$.

If these aren't true, the formula is wrong. In fact, this particular formula is always wrong for times $|t|$ large.

Also introduced some types of forces:

Gravity; normal forces; tension forces; friction: static $F \leq \mu_s N$
kinetic $F = \mu_k N$

Now, let's start to use these to solve problems: