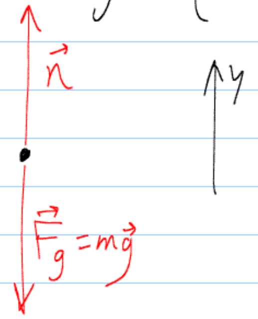
PHY131H1F Centre-screen notes
Wednesday Oct. 10, 2012

free body diagram (f.b.d) of car:



$\vec{a} = 0$

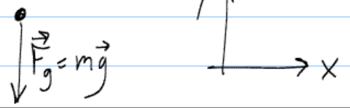
$\Rightarrow \vec{F}_{Net} = 0$

$(F_{Net})_y = n - mg = 0$

$n = mg$

$\boxed{a = \frac{F_{net}}{m}}$

F.b.d. of angry bird:

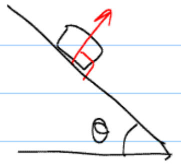


	x	y
$\vec{F}_g$	0	$-mg$
$\vec{F}_{Net}$	0	$-mg$

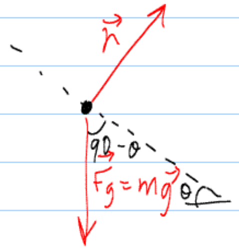
$(F_{Net})_x = 0 \Rightarrow a_x = 0$

$(F_{Net})_y = \cancel{m} a_y = -\cancel{m} g$

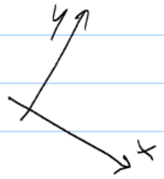
$\boxed{a_y = -g} \leftarrow$ Eq. 2.25!



f.b.d. of cart:



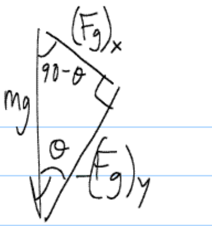
choose:



→ we know cart stays on track:

$\Rightarrow a_y = 0$

$\rightarrow$ We want to find a_x



$\sin\theta = \frac{(F_g)_x}{mg}$

$\cos\theta = \frac{(F_g)_y}{mg}$

	x	y
$\vec{F}_g$	$mg\sin\theta$	$-mg\cos\theta$
$\vec{n}$	0	n
$\vec{F}_{Net}$	$mg\sin\theta$	$-mg\cos\theta + n$

$$(F_{Net})_x = \cancel{m} a_x = \cancel{m} g \sin\theta$$

$$\boxed{a_x = g\sin\theta} \leftarrow \text{Eq. 2.26!}$$

Also, Note that: $(F_{Net})_y = 0 = -mg\cos\theta + n$

$$\Rightarrow \boxed{n = mg\cos\theta} \leftarrow \text{could be useful??}$$

Fbd.

$\uparrow \vec{a} \leftarrow$ towards centre of circular path.

$\uparrow \vec{F}_{Net}$ must be up.

$\vec{T} + \vec{F}_g$ must be up.

$T > F_g$