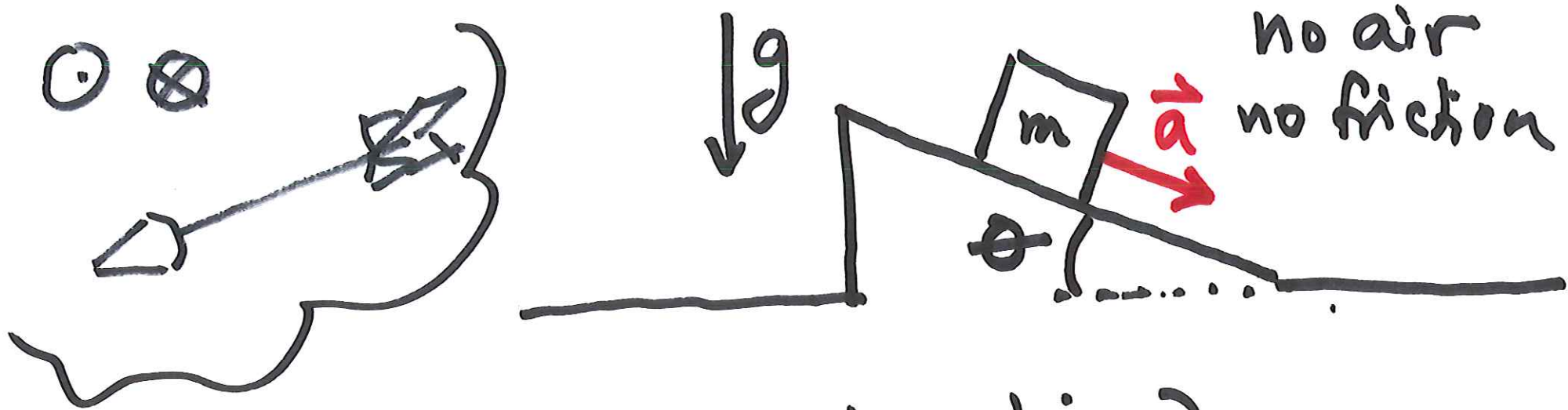


NYU Physics I

2018-09-18.

- Questions.
- PS 1.
- Tutoring! & office hours
- Block on a plane
- Exam 1

- Newton's Laws
- free-body diagrams
- friction; normal force.

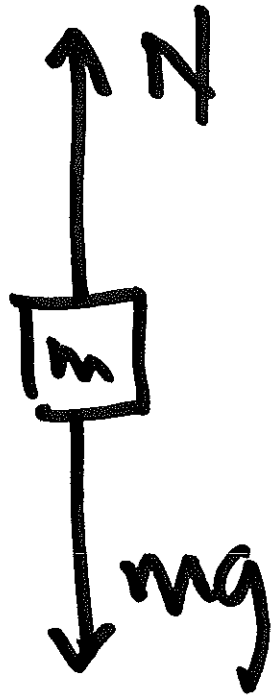
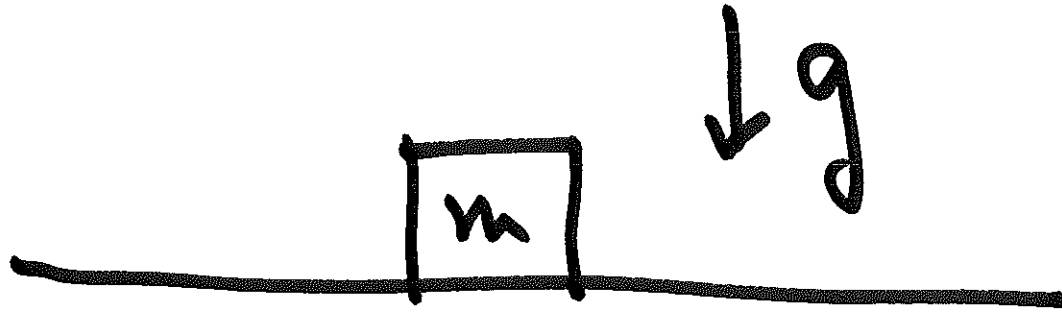


what is the acceleration?

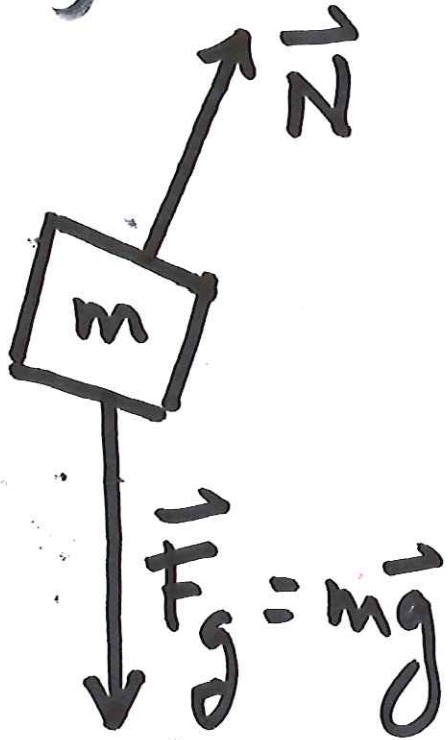
① guess: $|\vec{a}| = g \sin \theta$ ~~$g \frac{\theta}{90^\circ}$~~ $g \frac{2\theta}{\pi}$

$g \tan \frac{\theta}{2}$

"no friction" \equiv "no transverse force"



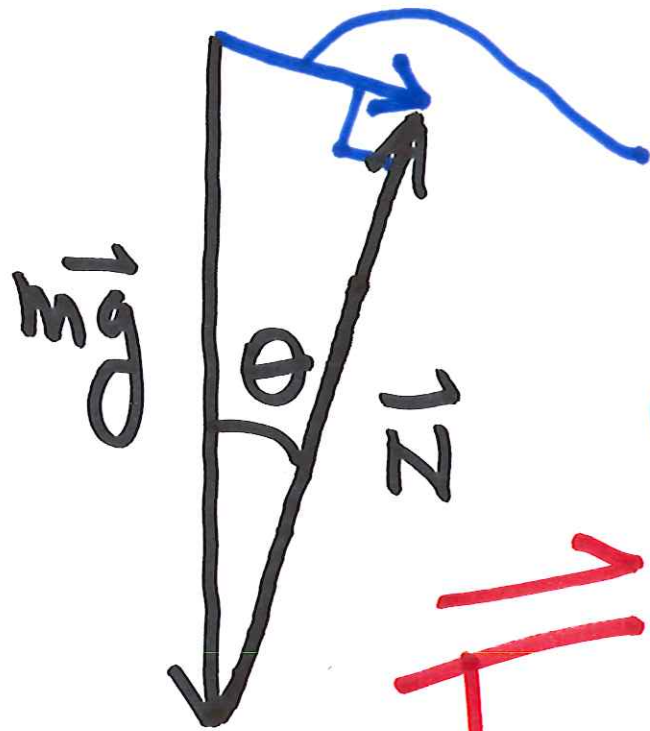
② Free-body diagram



③ think about kinematics!

$$\vec{a} \perp \vec{N}$$

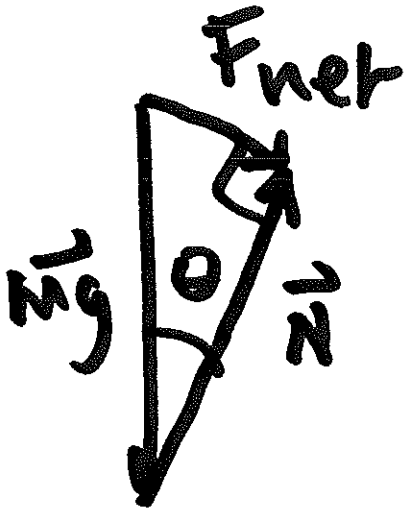
④ Net force - vector sum of all forces



$$\vec{F}_{net} = m\vec{g} + \vec{N}$$

Carefully chose $|\vec{N}|$ so
that $\vec{F}_{net} \perp \vec{N}$.

$$\vec{F}_{net} = m\vec{a}$$



$$|\vec{N}| = m|g| \cos \theta$$

$$|\vec{F}_{\text{net}}| = m|g| \sin \theta$$

$$|\vec{a}| = \frac{|\vec{F}_{\text{net}}|}{m} = g \sin \theta$$