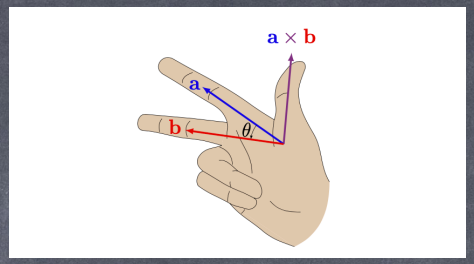
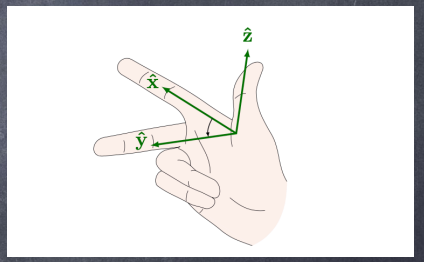
PHY 117 HS2024

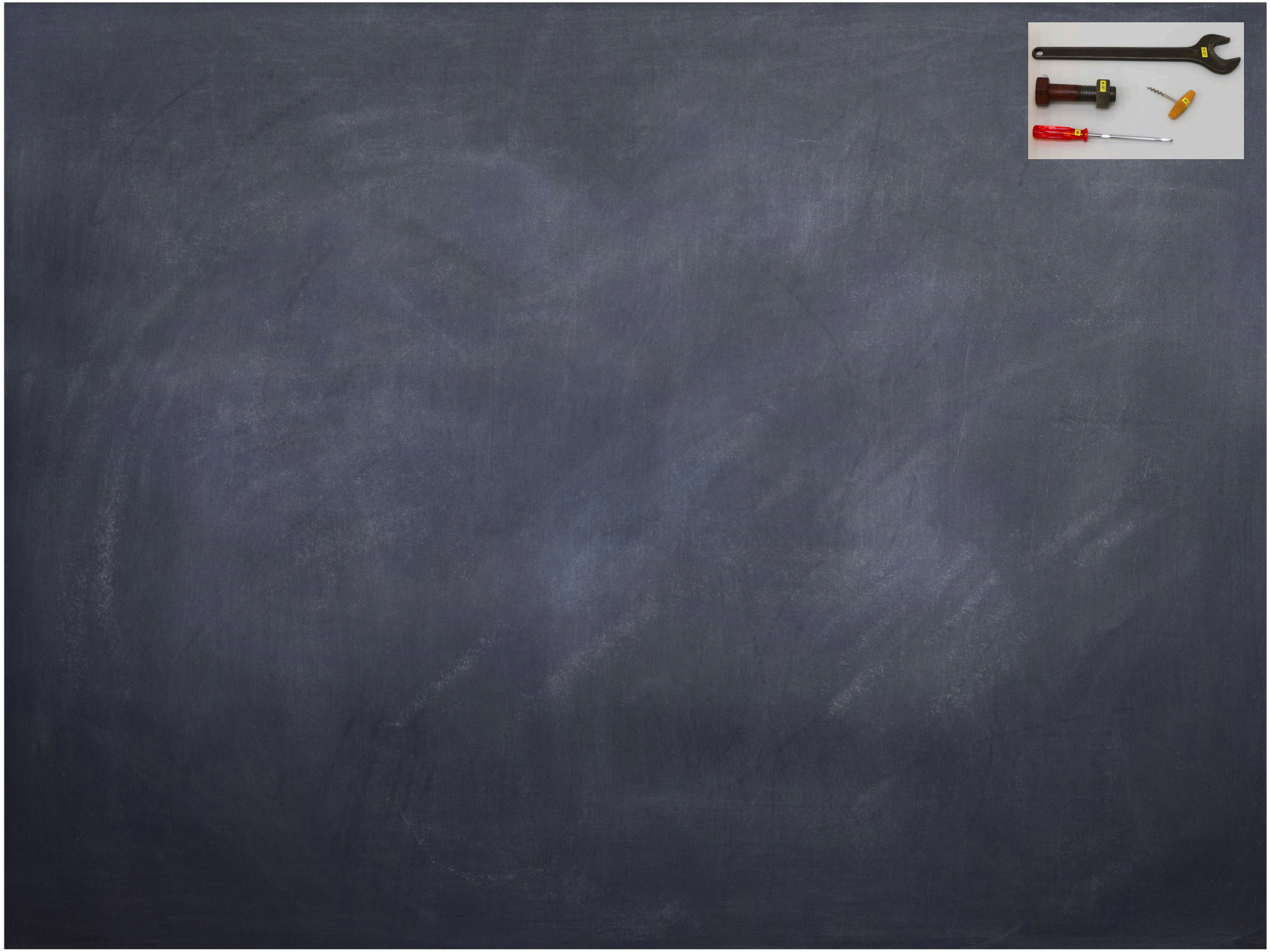
Today:

Cross product
Torque
Static equilibrium
Center of mass
Stability vs. rotation
Moment of inertia

Week 4, Lecture 1
Oct. 8th, 2024
Prof. Ben Kilminster

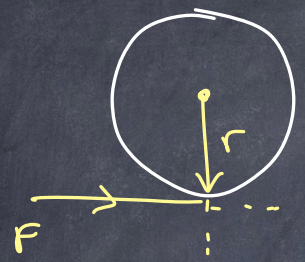

a × b
a
b
θ


ẑ
x̂
ŷ

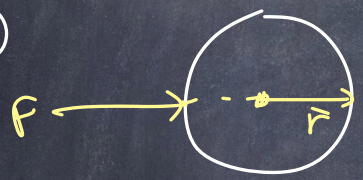


calculate the torque & direction for each case

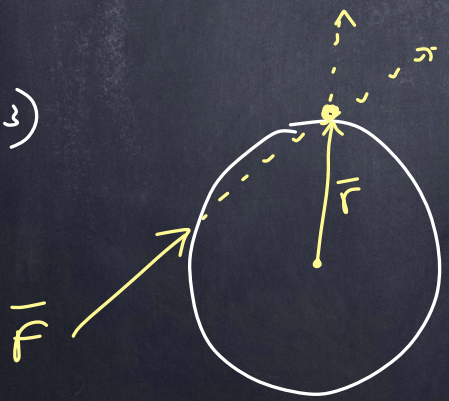
1)

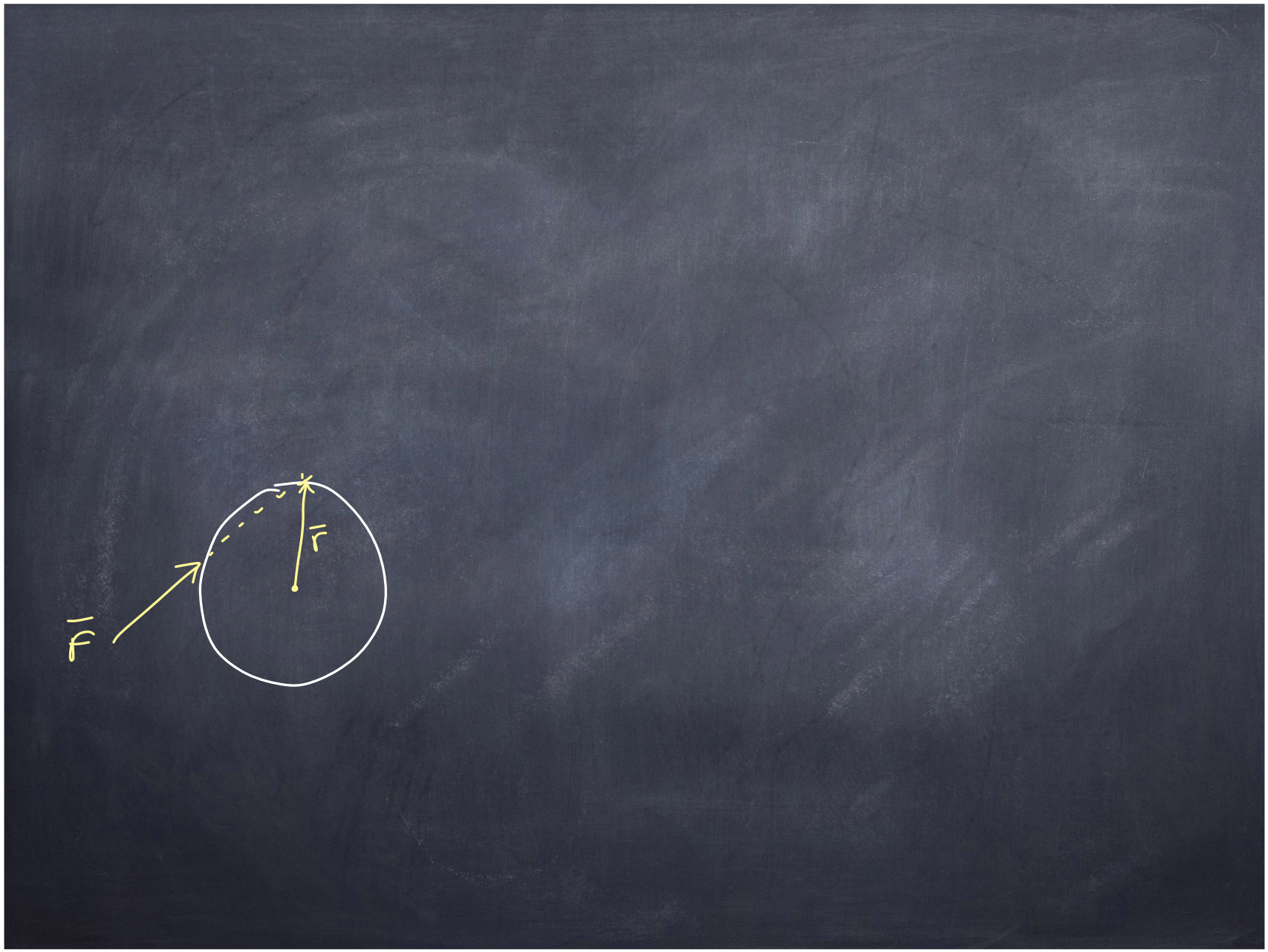


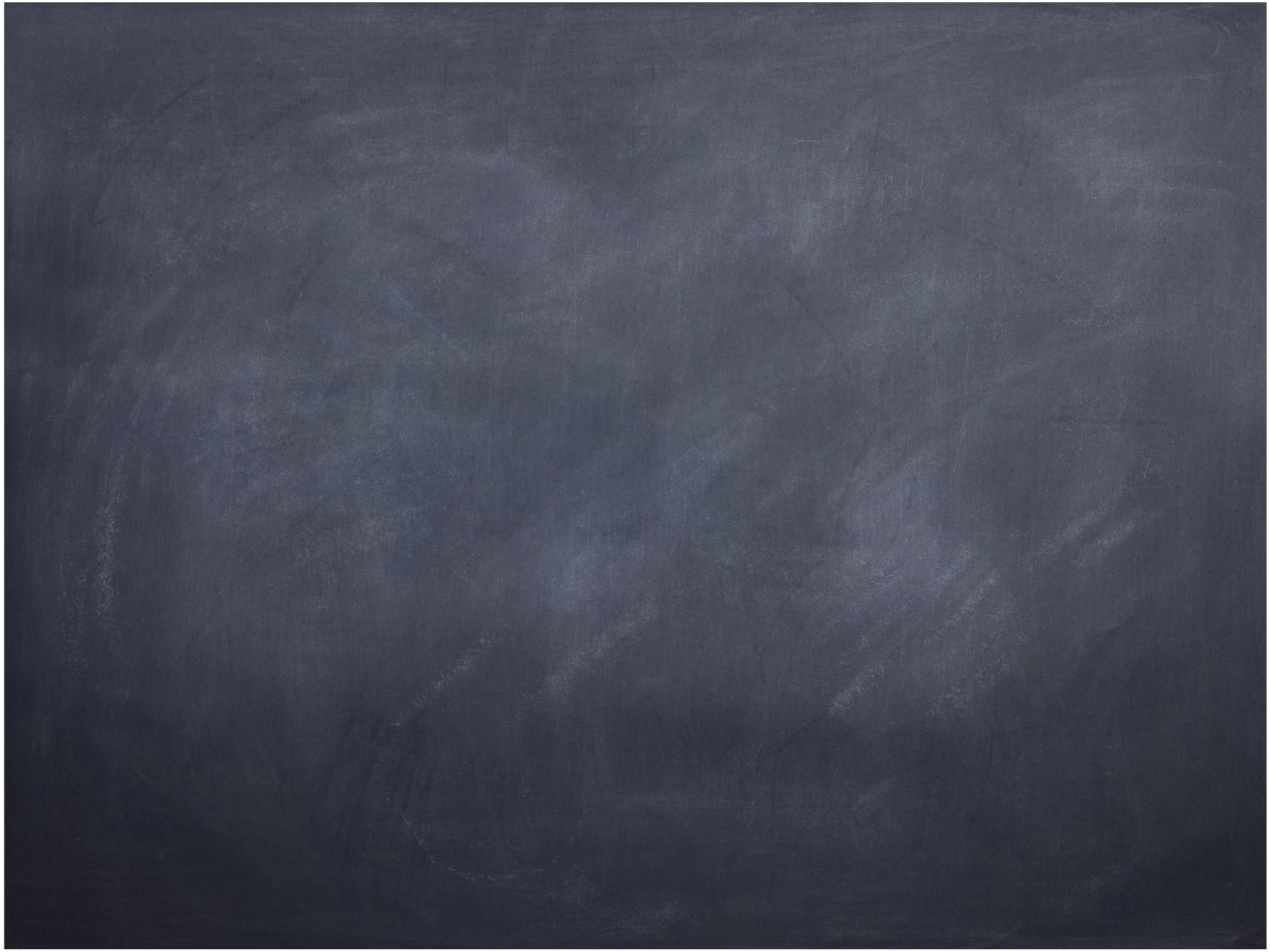
2)

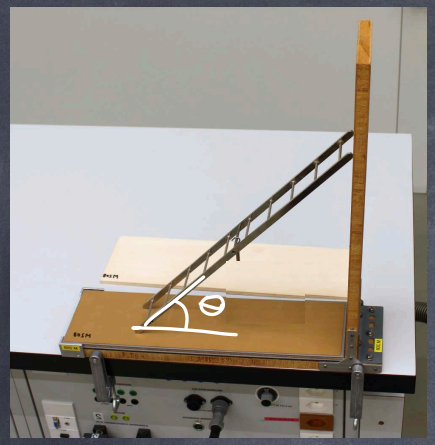


3)



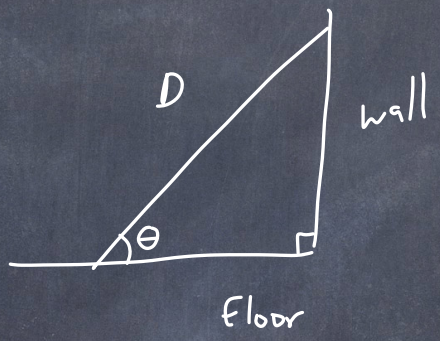

$\bar{F}$
$\bar{r}$



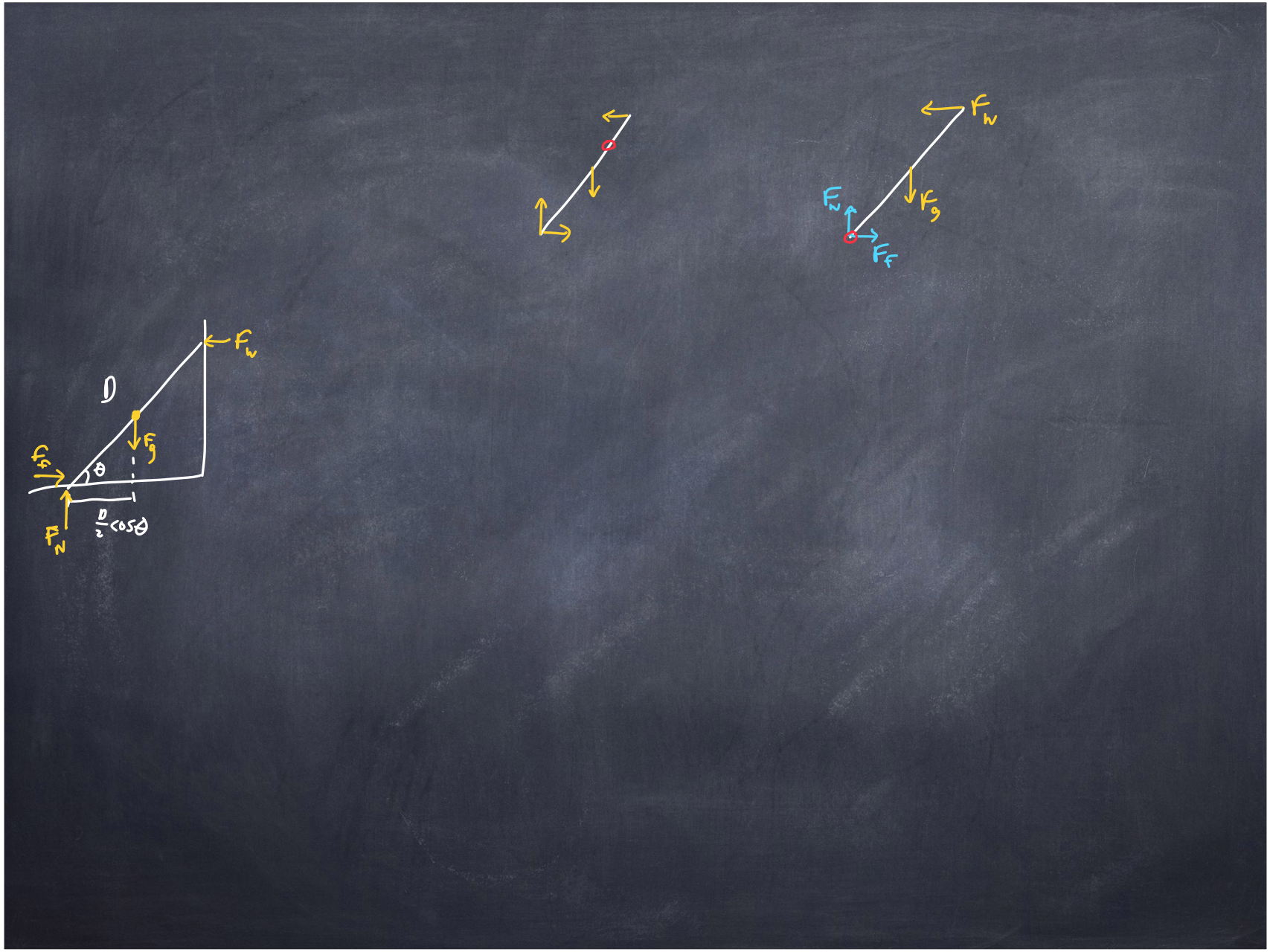


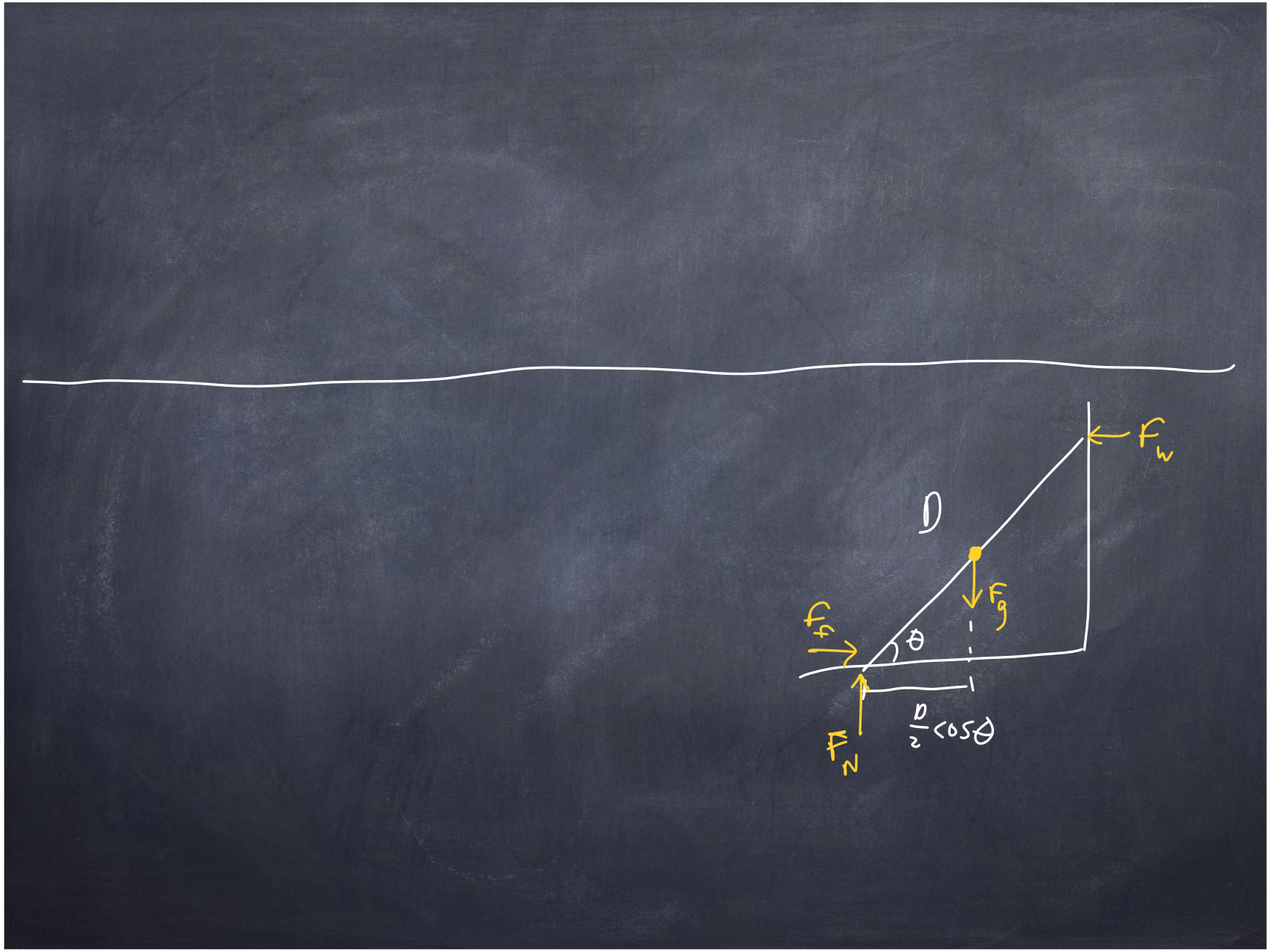
What is the smallest angle, θ_{min}, such that the ladder does not fall?

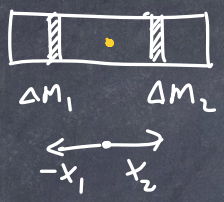
Ladder has mass, M
length, D
angle, θ

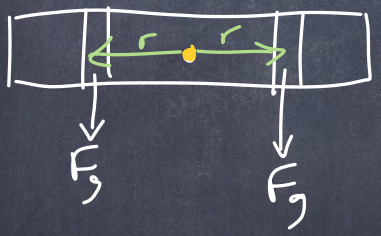


For now, we neglect friction of the ladder on wall.

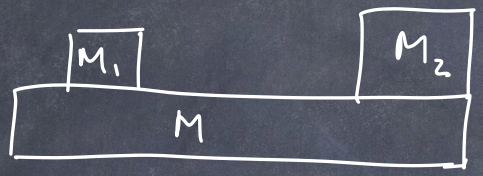

D
F_w
F_g
F_f
θ
F_N
$\frac{D}{2}\cos\theta$
F_w
F_N
F_g
F_f

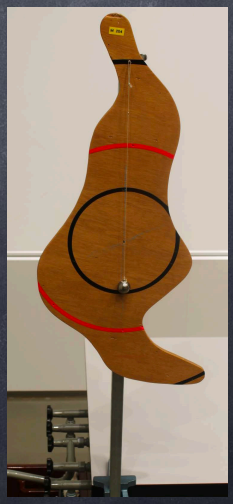

D
F_w
F_g
F_f
θ
F_N
$\frac{D}{2}\cos\theta$


ΔM1
ΔM2
-x1
x2

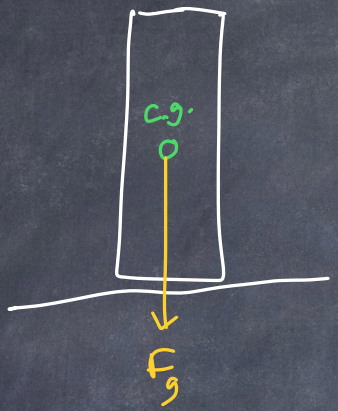

r
r
Fg
Fg

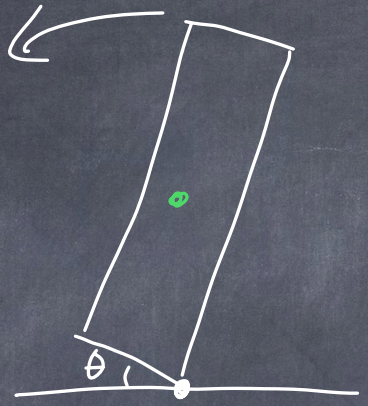
we can choose our origin of rotation at the center of gravity

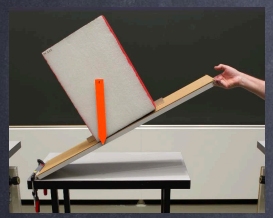


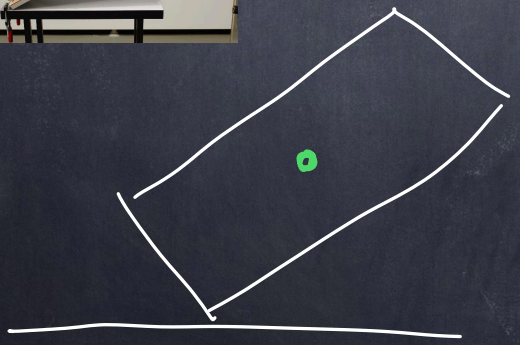


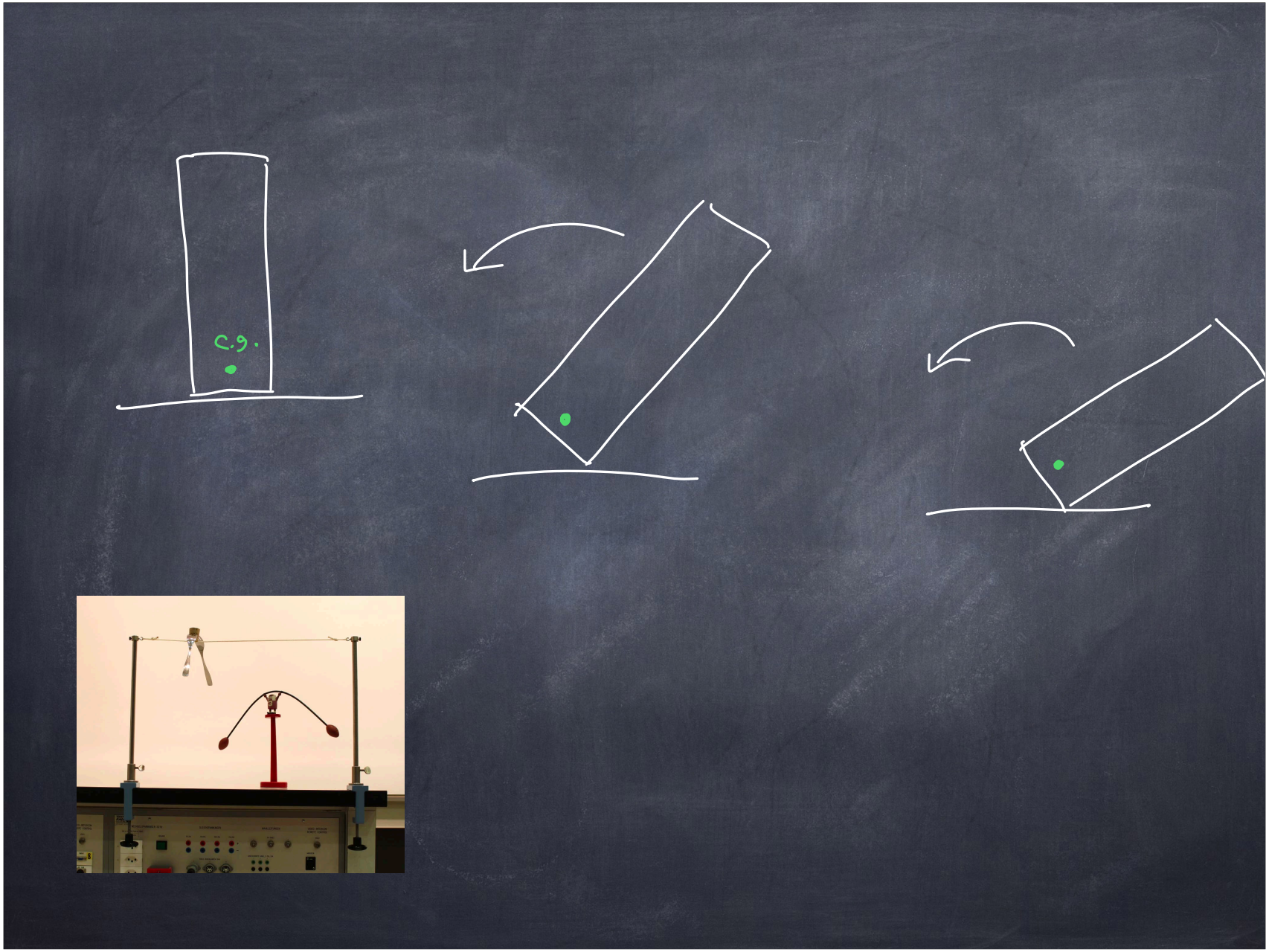
Stability



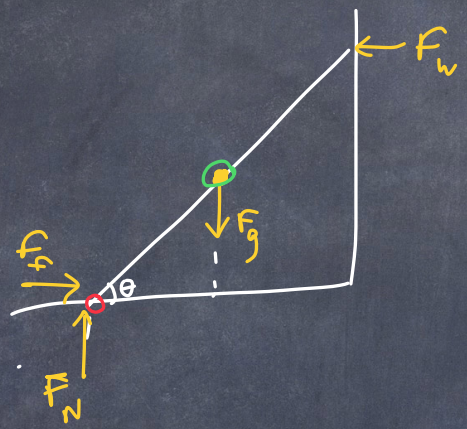







c.g.

Ladder:
what if we add a person?



More or less stable?