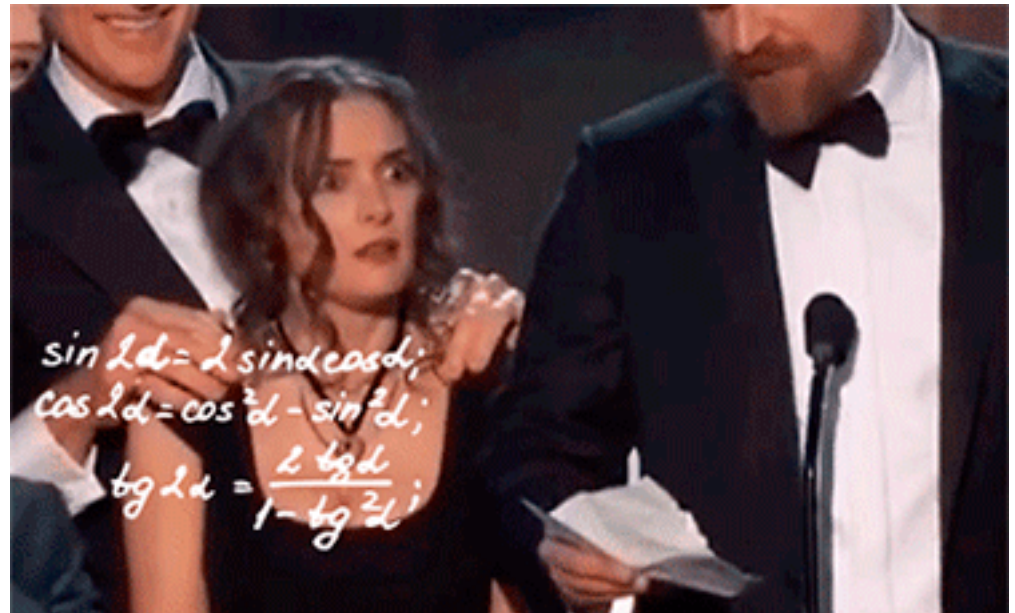# Announcements

- Take Optional Evening Matlab Lecture Poll on Piazza

- Quiz 5 next week – CBTF

- TAM210 CBTF Final: Nov. 9-12

- TAM211 CBTF Final: Dec.14-20 (tentative)

❑ Upcoming deadlines:

- Tuesday (10/31)
  - PL HW18

- Thursday (11/2)
  - ME HW17

- Friday (11/3)
  - WA#3 – going live tonight!

Friction

Friction is a force that resists the movement of two contacting surfaces that slide relative to one another. This force acts tangent to the surface at the points of contact and is directed so as to oppose the possible or existing motion between the surfaces.

Dry Friction (or Coulomb friction) occurs between the contacting surfaces of bodies when there is no lubricating fluid.

Figure: 08_COC
The effective design of each brake on this railroad wheel requires that it resist the frictional forces developed between it and the wheel. In this chapter we will study dry friction, and show how to analyze friction forces for various engineering applications.

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Dry friction

- Consider the effects of pulling horizontally (force **P**) a block of weight **W** which is resting on a **rough** surface.
- The floor exerts an uneven distribution of normal forces ΔN_n and frictional forces ΔF_n along the contacting surface.
- These distributed loads can be represented by their equivalent resultant normal forces *N* and frictional forces *F*
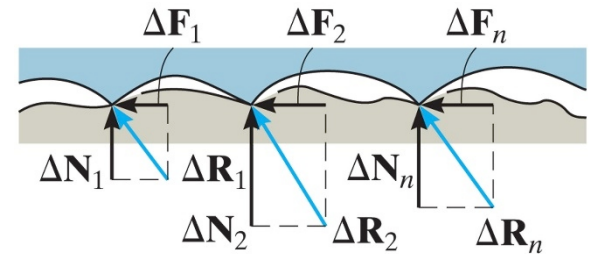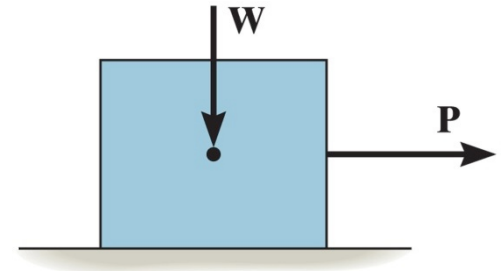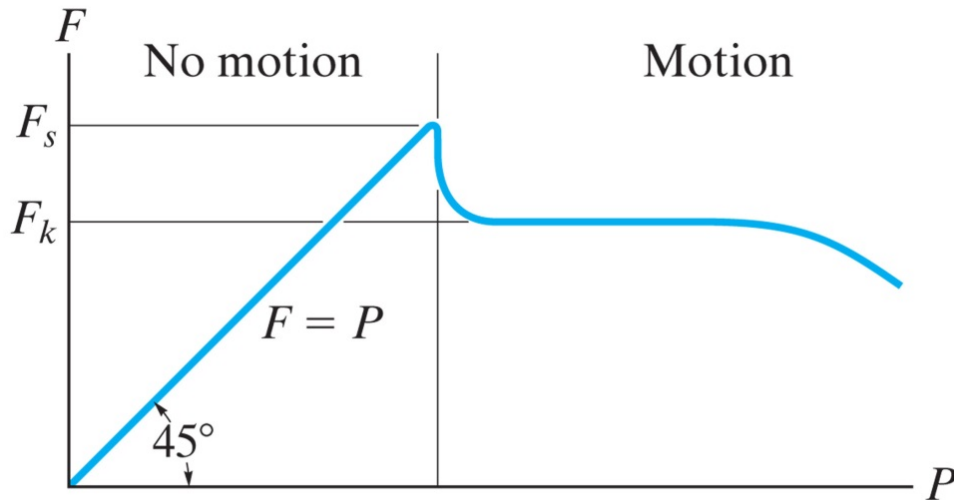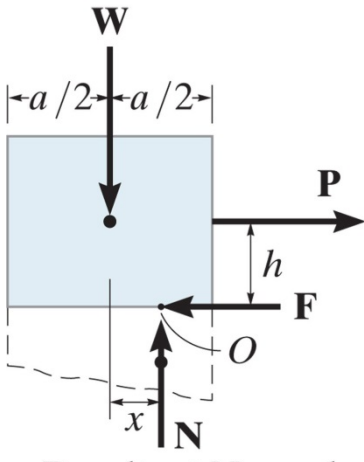
Dry friction

| Table 8–1 Typical Values for μ_s	
Contact Materials	Coefficient of Static Friction (μ_s)
Metal on ice	0.03–0.05
Wood on wood	0.30–0.70
Leather on wood	0.20–0.50
Leather on metal	0.30–0.60
Aluminum on aluminum	1.10–1.70

Determine μ$_s$ Experimentally

A block with weight W is placed on an inclined plane. What will happen to the block when the plane is slowly tilted?

Example

A wooden ladder with a mass of 10 kg is standing on wooden floor and leaning against a smooth wall. Can it maintain equilibrium if $\theta = 30°$?

M Fleischmann

4 m

A

B

θ
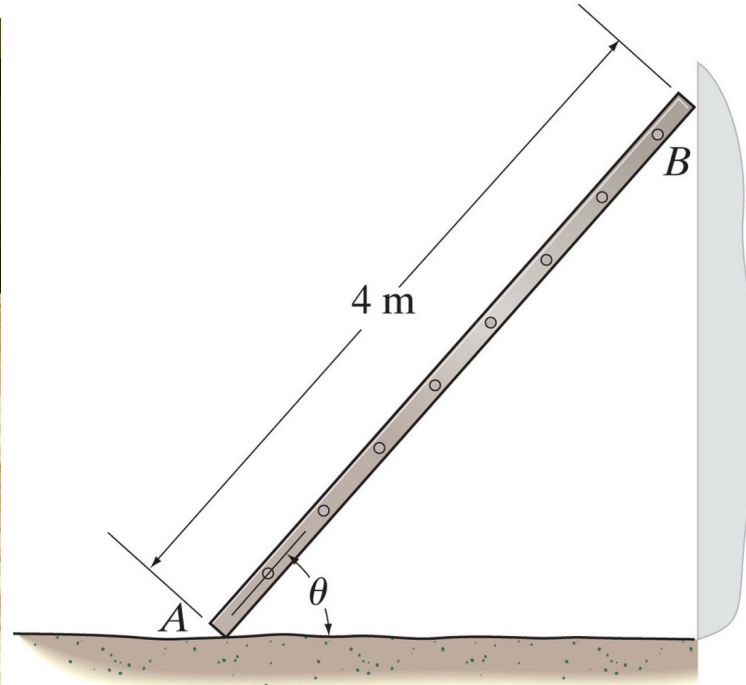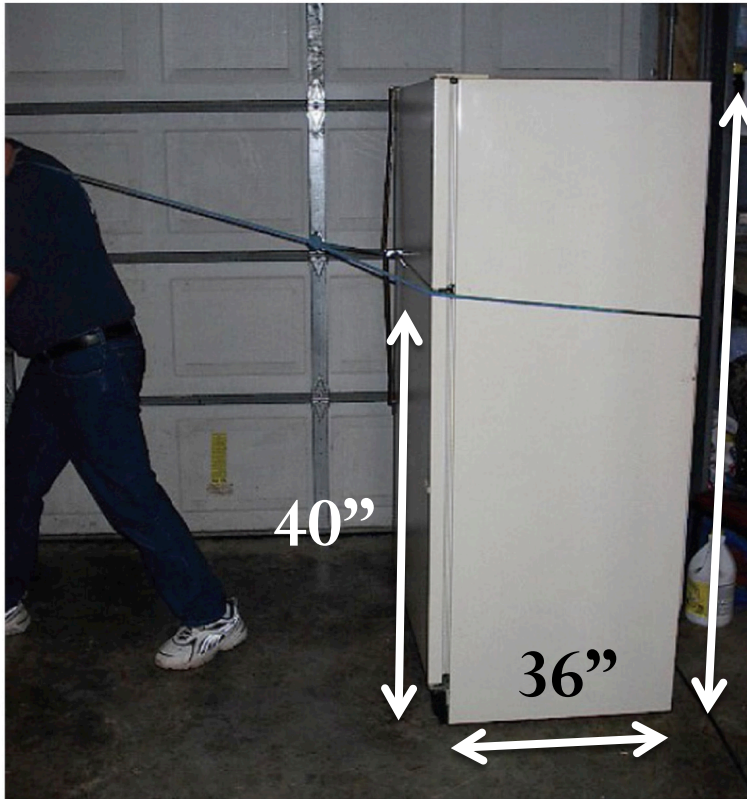
Given: Fridge weight $= 250$ lb and
$\mu_s = 0.4$

Find: The maximum horizontal force P that can be applied at without causing movement of the crate.

It is observed that when the bed of the dump truck is raised to an angle of $\theta=25°$ the vending machines will begin to slide off the bed. Determine the static coefficient of friction between a vending machine and the surface of the truck bed.