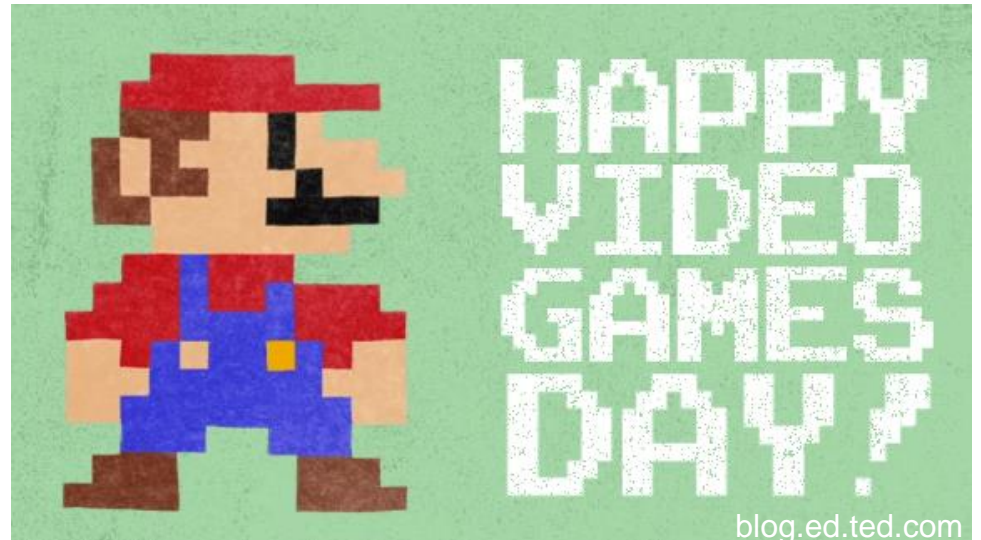


Announcements

- Morning Office Hours: Mon/Wed, 10–11am in 220H MEB
- Quiz 1 starts tomorrow

□ Upcoming deadlines:

- Friday (9/14)
 - WA#2
- Tuesday (9/18)
 - PL HW3

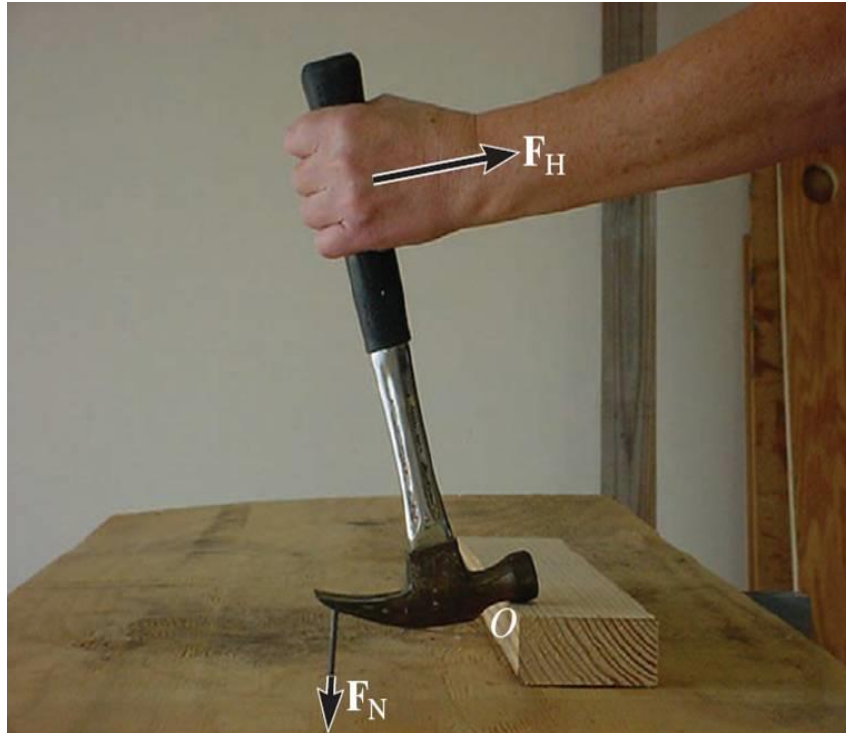


Chapter 4: Force System Resultants

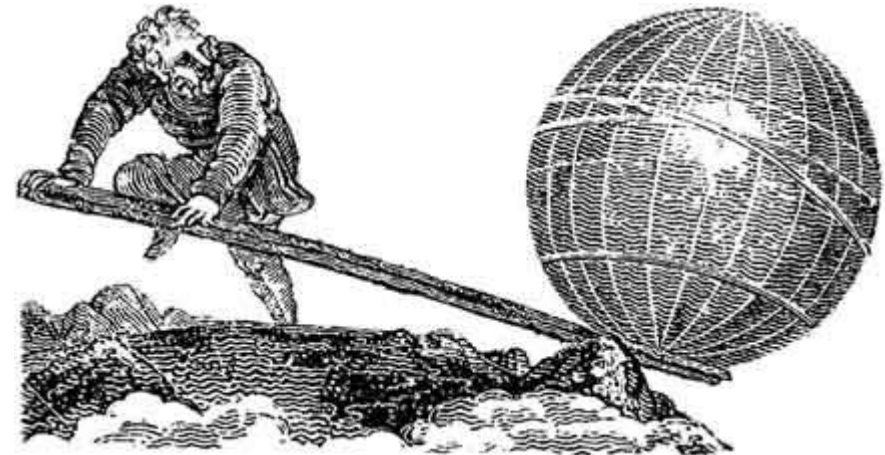
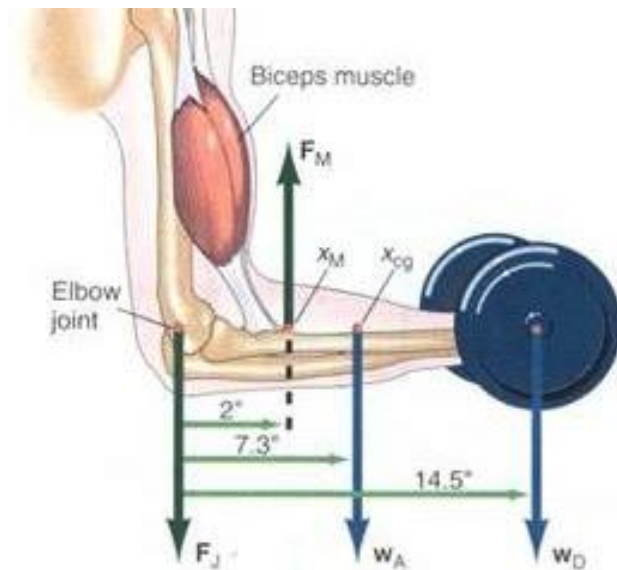
Goals and Objectives

- Discuss the concept of the moment of a force and show how to calculate it in two and three dimensions

Applications

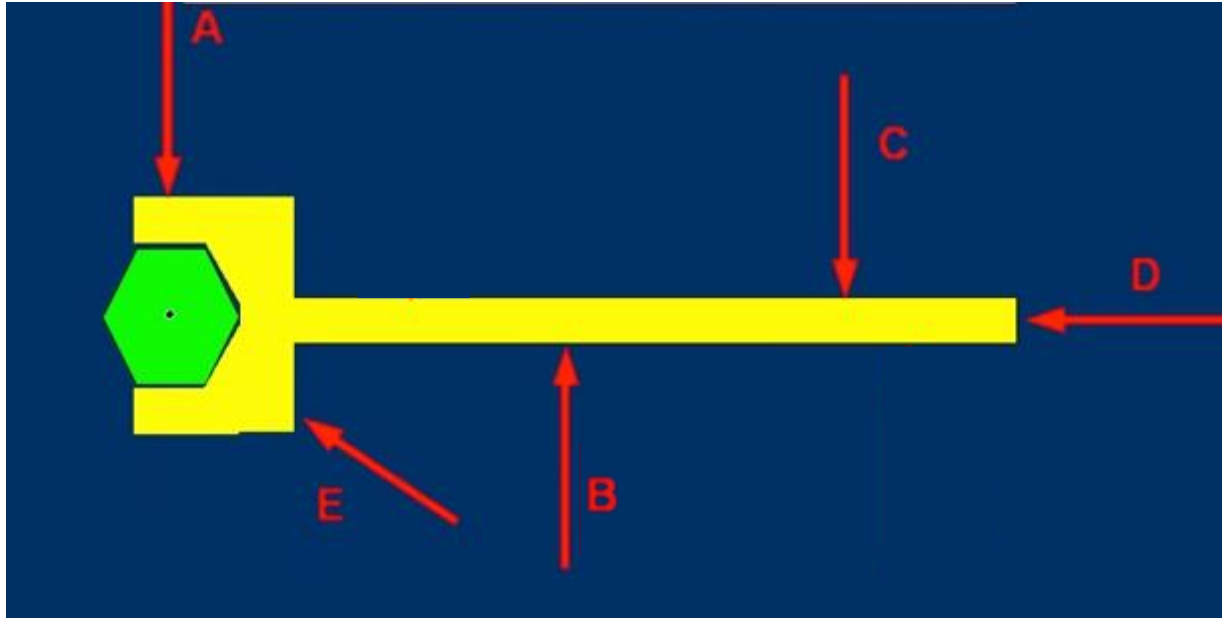


Carpenters often use a hammer in this way to pull a stubborn nail. Through what sort of action does the force F_H at the handle pull the nail? How can you mathematically model the effect of force F_H at point O ?



Moment 1. a very brief period of time. An Exact point in time. 2. importance. 3. A turning Effect produced by a force acting at a distance on An object.

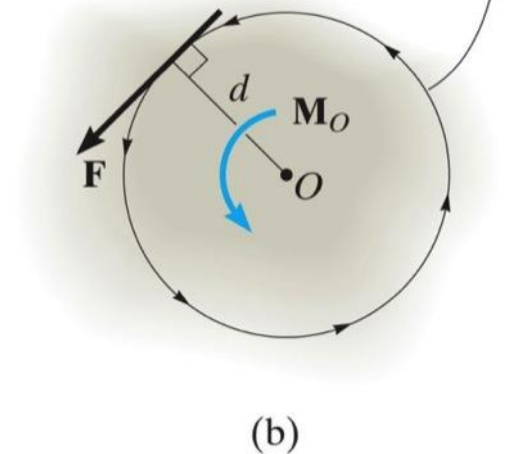
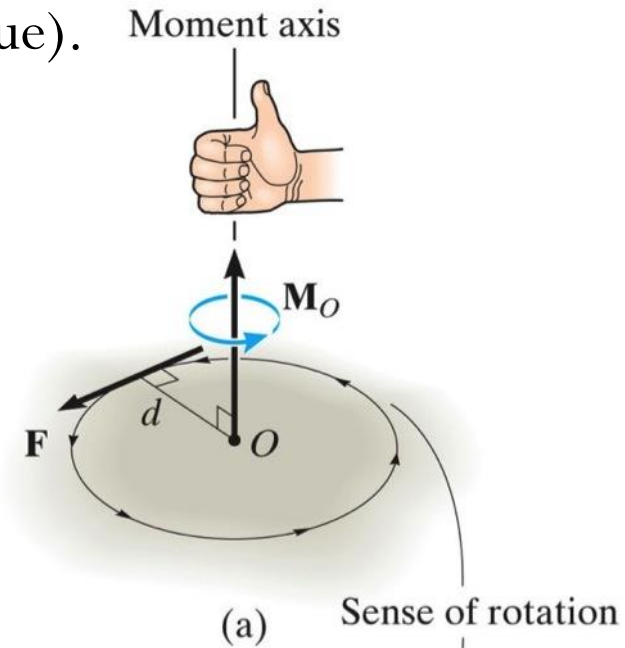
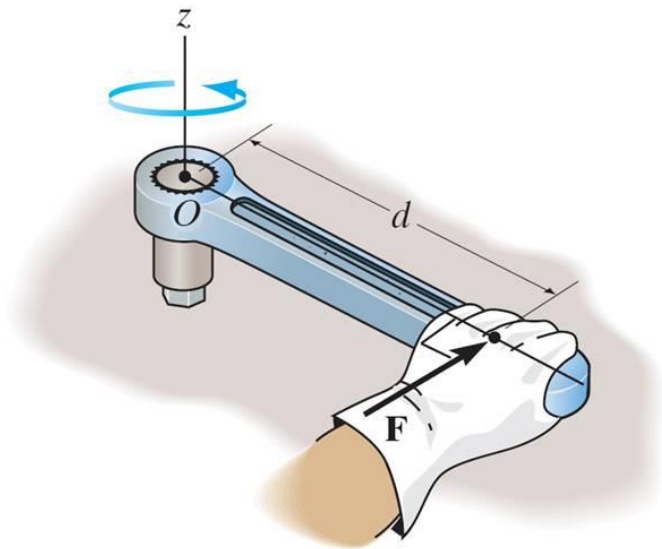
Moment of a Force



Which force(s) have NO turning effect?

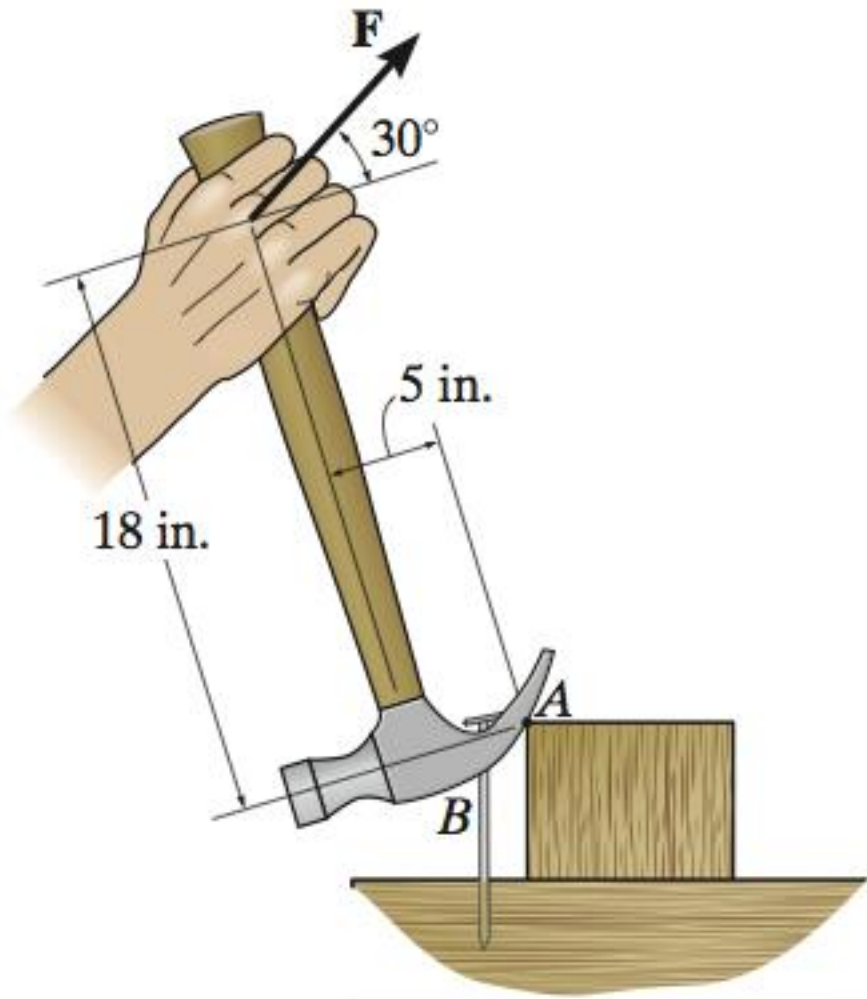
Moment of a force – scalar formulation

The **moment of a force about a point** provides a measure of the **tendency for rotation** (sometimes called a torque).



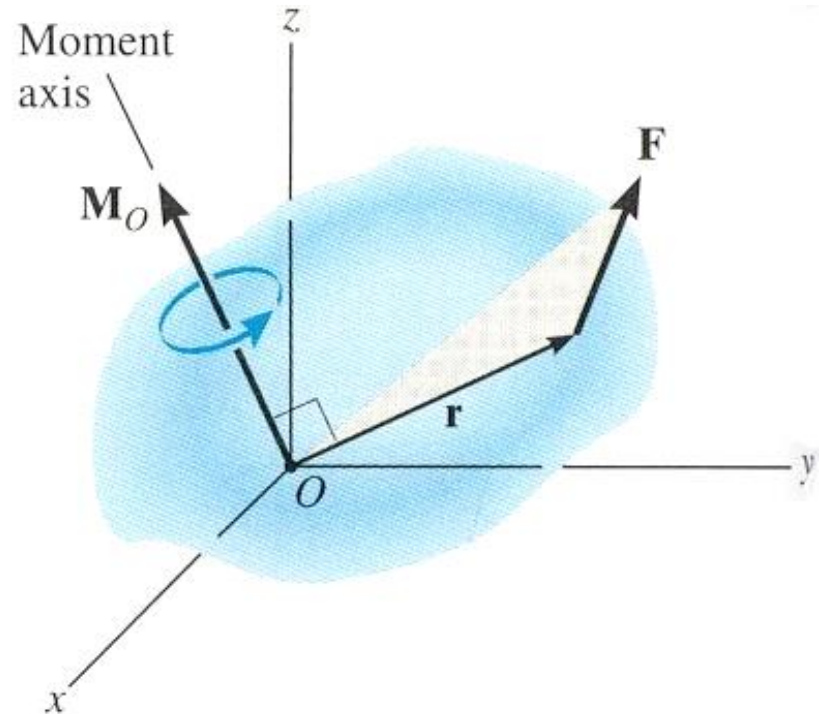
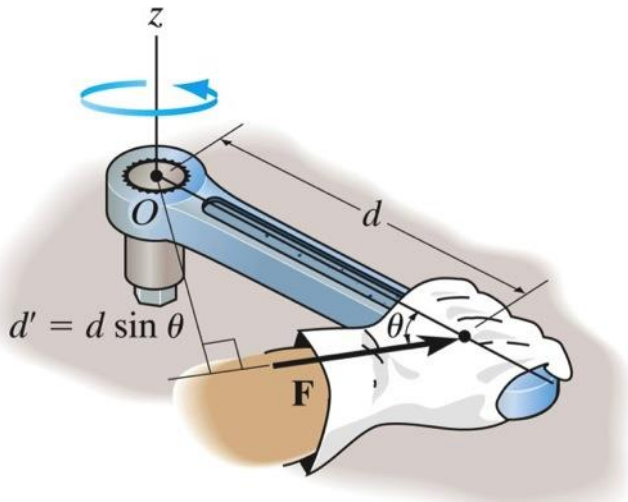
Example – Scalar Formulation

Determine the moment of this force about the point A as a function of F .

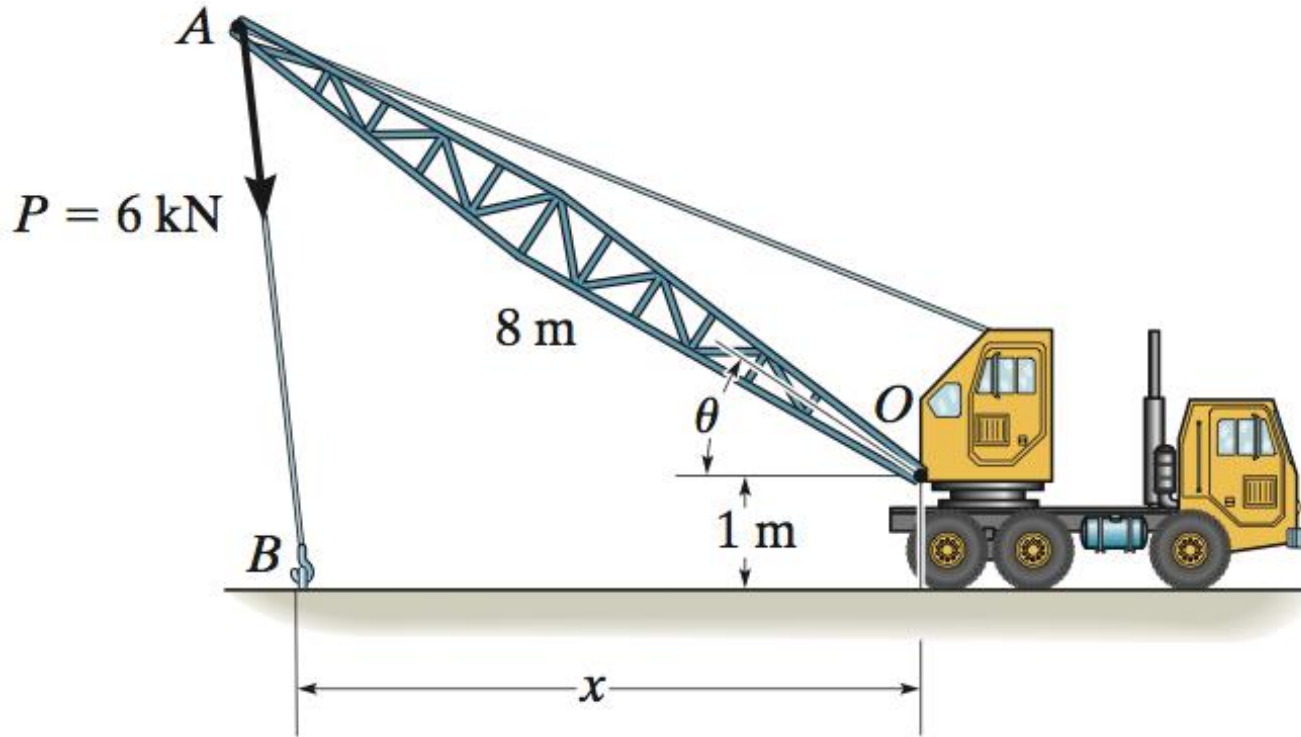


Moment of a force – vector formulation

The moment of a force \mathbf{F} about point \mathbf{O} , or actually about the moment axis passing through \mathbf{O} and perpendicular to the plane containing \mathbf{O} and \mathbf{F} , can be expressed using the cross (vector) product, namely:



Example – Vector Formulation



Given: The angle $\theta = 30^\circ$ and $x = 10 \text{ m}$.

Find: The moment by \mathbf{P} about point O.

Example – Vector Formulation

Given: $\mathbf{F} = \{600\mathbf{i} + 800\mathbf{j} - 500\mathbf{k}\}$ N

Find: Moment of the force about point B .

