

↻ Last Lecture

- ↻ Introduction

↻ Today

- ↻ Force as a vector
- ↻ Static equilibrium $\sum \vec{F} = 0$
- ↻ Addition and subtraction on vectors

↻ Important Concepts

- ↻ Force is a vector, both magnitude and direction matter
- ↻ Vectors: Think with arrows, calculate with components

↻ Problem Solving Tool: Setting up

- ↻ Make a careful drawing
- ↻ Think carefully about all of the forces
- ↻ Chose an axis, put it on your drawing
- ↻ Think carefully about the angles

↻ Problem Solving Tool: Component checklist

- ↻ Loop through vectors, is there a component?
- ↻ Is there an angle factor
- ↻ Is sine or cosine?
- ↻ Is it positive or negative?

Important Announcement

- ↻ If you, or anyone you know was advised that you should not take both 8.01L and 18.01A now because they cannot take 8.01L and 18.02A in IAP:

THIS IS WRONG!!

Many, many students have taken 8.01L and 18.02A during IAP. This is NOT a problem.

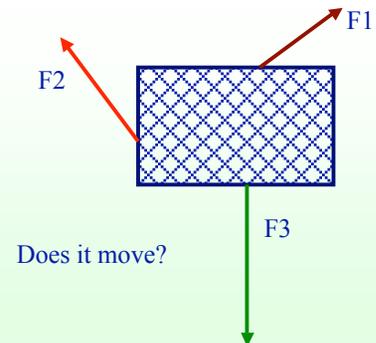
“Chalkboard” Outline

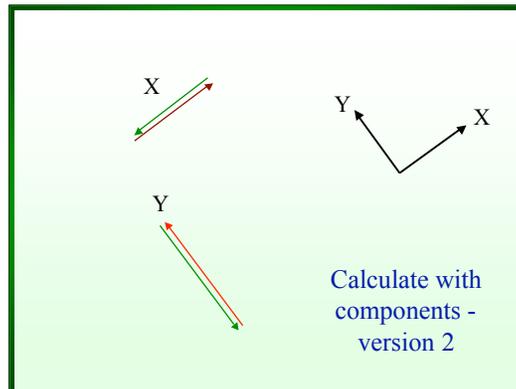
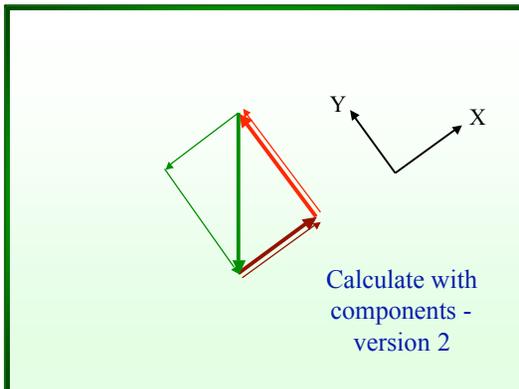
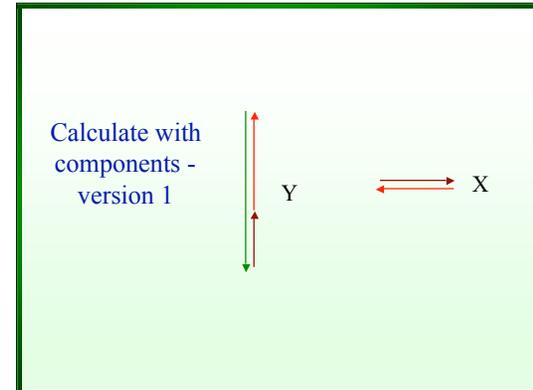
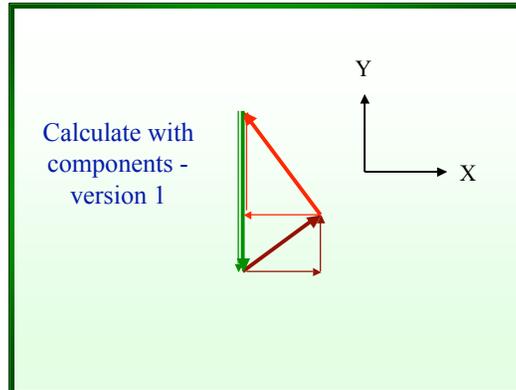
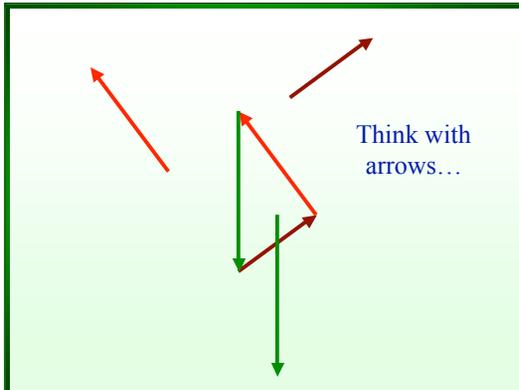
- ↻ What is a vector?
- ↻ How do you describe a vector?
- ↻ How do you add and subtract vectors?

- ↻ What does this have to do with forces?

Basic idea behind components

- ↻ Want to do a quantitative calculation with vectors
- ↻ Need to convert multi-dimensional object to numbers, add or subtract or multiply the numbers, and then generate the multi-dimensional answer
- ↻ Write each vector as a sum of smaller sub-vectors, all of which point in the same direction.





Summary

- Vector: Any quantity characterized by both a magnitude and direction.
- Adding or subtracting vectors: Think with arrows, calculate with components.
- Force is a vector.
- First criterion for static equilibrium is that the total force (added as vectors) is zero.