To do ...

- HW 12 PL due Tues
- HW 13 ME due Thurs
- WA 7 due Sun

Q: Office hours?
Quiz 3 results

Mean 75%
Median 85%
Flawless victories 12%

Keep it up!

Physics Review

NEW Stuff
Chapter 6: Structural Analysis
Main goals and learning objectives

- Determine the forces in members of a truss using the method of joints
- Determine zero-force members
- Determine the forces in members of a truss using the method of sections
Zero-force members

- Particular members in a structure may experience no force for certain loads.
- Zero-force members are used to increase stability.
- Identifying members with zero-force can expedite analysis.

2 members
- non collinear
- no external force, support
- both zero

3 members
- 2 collinear, then 3rd member is zero
Find the forces in each member of the truss.

1. Draw FBD of truss
2. Locate zero force members
3. Apply Equations of equilibrium

Joint A

Joint B

Joint C

Joint D

* Two collinear members, third member

\[ F_{BD} = 0 \]

\[ F_{AB} = F_{BC} \]

\[ \sum F_x: -450 - F_{AD} \cos 45 + F_{CD} \cos 45 = 0 \]

\[ \sum F_y: -F_{AD} \sin 45 - F_{CD} \sin 45 = 0 \]
\[ \mathbf{F}_{AB} = \mathbf{F}_{BC} \]

\[ \sum F_y: -F_{AD} \sin 45^\circ - F_{CD} \sin 45^\circ = 0 \]

\[ F_{AD} = -F_{CD} = \]

\[ F_{CD} = \frac{450}{2 \cos 45^\circ} = 318 \text{ lb (T)} \]

\[ F_{AD} = -318 \text{ lb (C)} \]

Joint A

\[ \sum F_y: \mathbf{F}_{AB} + F_{AD} \cos 45^\circ = 0 \]

\[ \sum F_y: A_y + F_{AD} \sin 45^\circ = 0 \]

\[ F_{AB} = -F_{AD} \cos 45^\circ = -(-318) \cos 45^\circ = 225 \text{ lb (T)} \]

\[ F_{BC} = F_{AB} = 225 \text{ lb (T)} \]