Housekeeping

- HW 9 due **Tonight**
- HW 10 due **Wed**
- WA4 posted – due **Sunday Feb 21st**
- Quiz 2 (**Tues Feb 16 – Sat Feb 20**) – DO IT!

- Prof Kersh
  - Fridays 9:00-10:00
  - MEB 126

- Prof Juarez
  - Mondays 15:00-16:00
  - MEL 4415
Rapid Refresh ...

- i
- <3
- c
- l
- i
- i
- c
- c
- k
- e
- r
FTW!! - Are these systems the same?

Force system I

Force system II

$A - YES$

$B - NO$

$M_c = Fd$
What is the equivalent system?
1. For this force system, the equivalent system at P is __________. 

A) $F_{RP} = 40 \text{ lb (along } +x\text{-dir.})$ and $M_{RP} = +60 \text{ ft } \cdot \text{lb}$

B) $F_{RP} = 0 \text{ lb and } M_{RP} = +30 \text{ ft } \cdot \text{lb}$

C) $F_{RP} = 30 \text{ lb (along } +y\text{-dir.})$ and $M_{RP} = -30 \text{ ft } \cdot \text{lb}$

D) $F_{RP} = 40 \text{ lb (along } +x\text{-dir.})$ and $M_{RP} = +30 \text{ ft } \cdot \text{lb}$
2. The forces on the pole can be reduced to a single force and a single moment at point ____.

A) P  B) Q  C) R  
D) S  E) Any of these points.
3. Consider two couples acting on a body. The simplest possible equivalent system at any arbitrary point on the body will have
A) One force and one couple moment.
B) One force.
C) One couple moment.
D) Two couple moments.
Replace the force system acting on the post by a resultant force and resultant moment about point A, and specify where its line of action intersects the post AB measured from point B.
Given: The slab is subjected to three parallel forces.

Find: The equivalent resultant force and couple moment at the origin O. Also find the location (x, y) of the single equivalent resultant force.
Reduction of a simple distributed load
Reduction of a simple distributed load

In structural analysis, we often are presented with a distributed load $w(x)$ (force/unit length) and we need to find the equivalent loading $F$.

Example of such forces are winds, fluids, or the weight of items on the body’s surface.
Triangular loading

\[ w(x) \]

\[ w(L) = w_0 \]
Rectangular loading

\[ w(x) = w_0 \]
4. $F_R = \ \underline{\ \ \ \ \ \ \ \ \ \ }$

A) 12 N B) 100 N
C) 600 N D) 1200 N
4. $F_R = \underline{\text{__________}}$

   A) 12 N  B) 100 N  
   C) 600 N  D) 1200 N

5. $x = \underline{\text{__________}}$

   A) 3 m  B) 4 m  
   C) 6 m  D) 8 m
Replace the loading by an equivalent resultant force and specify its location on the beam measured from point B.
Replace the loading by an equivalent resultant force and specify its location on the beam measured from point A.
Determine the length “a” such that the resultant force and couple moment acting on the beam are zero.

A) 7.5 ft  
B) 3.75 ft  
C) 4.5 ft  
D) 9.75 ft