Announcements

- Written Assignment 1 due today
- Piazza etiquette

- Upcoming deadlines:
  - Tuesday (9/26)
    - PL HW8
  - Thursday (9/28)
    - ME HW9

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xkcd.com
Recap

- Equivalent force systems
Example – Equivalent System

Replace the force and couple system acting on the frame by an equivalent resultant force and moment at A.
Distributed Loading

What is the equivalent sys...
Distributed Loading

A common case of distributed loading in a uniform load along one axis of a flat rectangular body.

In such cases, $w$ is a function of $x$ and has units of

Consider an element of length $dx$. The force magnitude $dF$ acting on it is given as

The net force on the beam is given by
The force $dF$ will produce a moment about $O$ of

The total moment about point $O$ is

Assuming that $F_R$ acts at $x$, it will produce the moment about point $O$ as

Hence,
Rectangle Loading

$$w(x) = w_0$$
Triangle Loading

\[ w(L) = w_0 \]
Example

Find the equivalent force and its location from point $A$ for the loading on the beam as shown.
Example

Find the equivalent force and its location from point A for the loading on the beam as shown.