

MAE 415 – Analysis of Structures

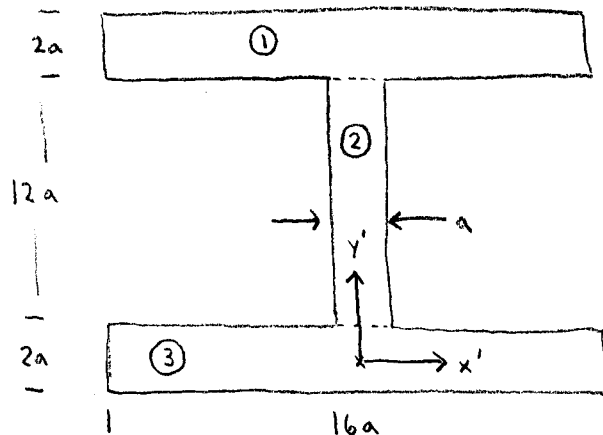
Instructors: Bloebaum/Hulme

Assignment #5

Due date: 10/6/00, BEFORE class begins

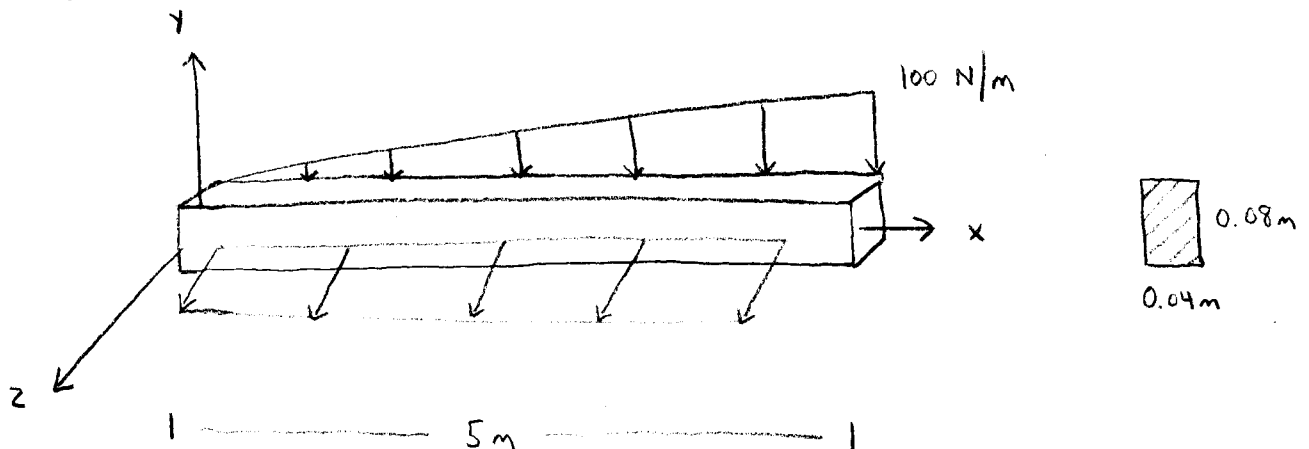
Class web page: <http://www.eng.buffalo.edu/~clb/mae415.html>

1. Given: I section as shown in the figure for which the Young's modulus in the top flange and in the web has been reduced due to application of high temperature, such that: $E_1 = 3/5 E_0$, $E_2 = 4/5 E_0$, $E_3 = E_0$.



Find: The modulus-weighted centroid, and section properties: I_{xx}^* , I_{yy}^* , I_{xy}^* .

2. Given: A cantilever beam, shown in the figure. The beam is in a state of pure bending, and is loaded on two of its faces.



Find:

- The *magnitude* of the maximum compressive normal stress σ_{xx} . Also, using common sense and physical feel, explain the *location* of this stress on a given cross-sectional plane.
- The horizontal and vertical deflection at the tip of the beam.
- The total tip displacement, and its orientation.