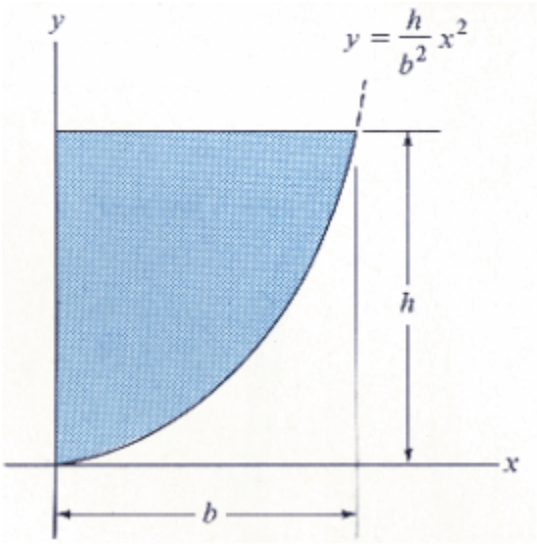
Engineering Statics
Homework 6

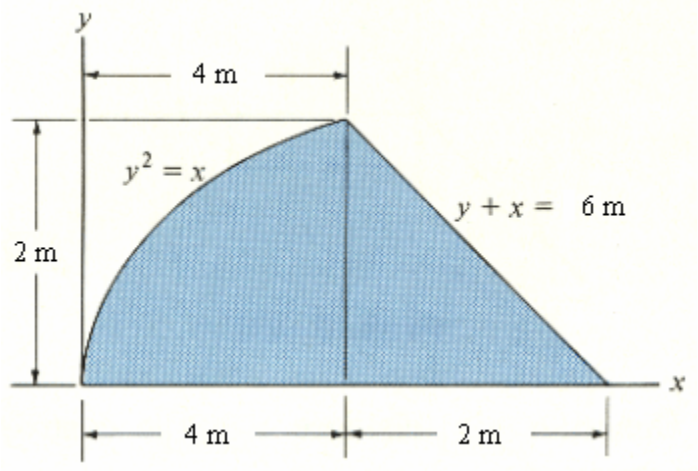
1.
Locate the centroid of the parabolic area, where $h = 7$ and $b = 1$.



$\bar{x}$ = _____

$\bar{y}$ = _____

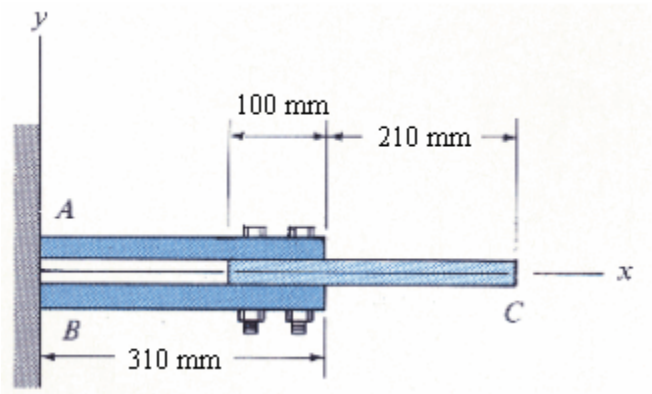
2.
Locate the centroid of the shaded area.
Hint: Choose elements of thickness *dy* and length $[(6\text{-}y)\text{-}y^2]$.



$\bar{x}$ = _____ m

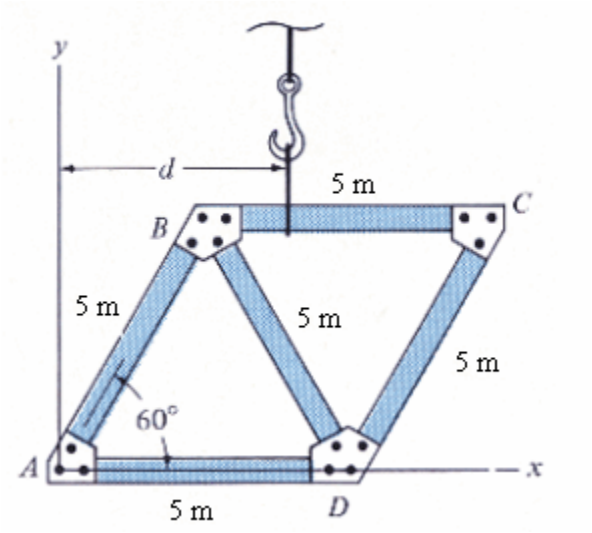
$\bar{y}$ = _____ m

3.
The steel and aluminum plate assembly is bolted together and fastened to the wall. Each plate has a width of 210 mm and thickness of 15 mm. If the mass density of *A* and *B* is $\rho_s = 7.85$ Mg/m^3, and for *C*, $\rho_{al} = 2.71$ Mg/m^{3}determine the location $\bar{x}$ of the center of mass. Neglect the size of the bolts.



$\bar{x}$ = _____ mm

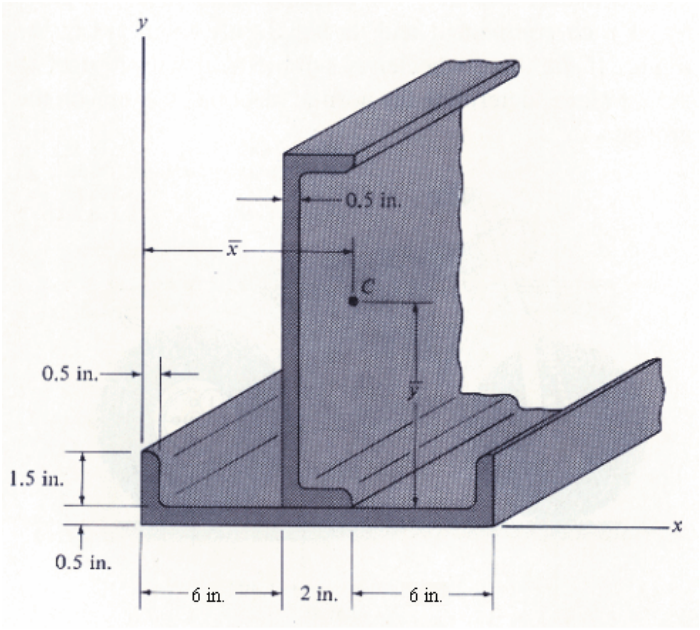
4.
The truss is made from five members, each having a length of 5 m and a mass of 7 kg/m. If the mass of the gusset plates and the thickness of the members can be neglected, determine the distance *d* to where the hoisting cable must be attached, so that the truss does not tip (rotate) when it is lifted.



d = _____ m

5.

Determine the location ($\bar{x}$, $\bar{y}$) of the centroid *C* of the cross-sectional area for the structural member constructed from two equal-sized channels welded together as shown. Assume all corners are square. Neglect the size of the welds.

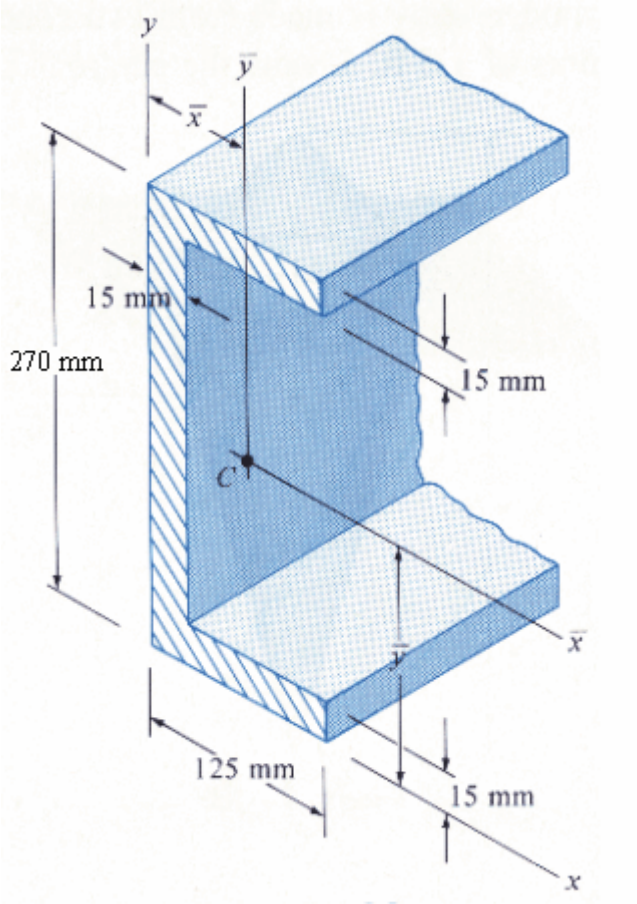


$\bar{x}$ = _____ in.

$\bar{y}$ = _____ in.

6.

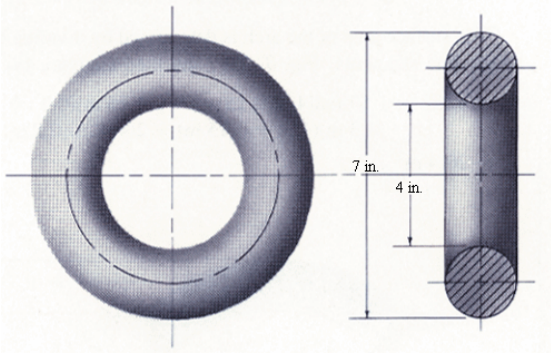
Locate the centroid $C(\bar{x}, \bar{y})$ of the channel's cross-sectional area.



$\bar{x}$ = _____ mm

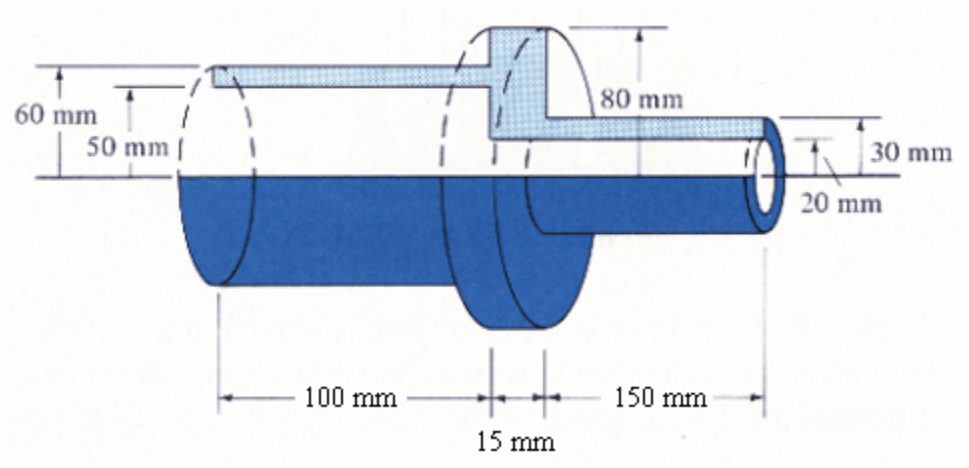
$\bar{y}$ = _____ mm

7.
The anchor ring is made of steel having a specific weight of 490 lb/ft^3. Determine its weight. The cross section is circular as shown.



$W =$ _____ lb

8.
The circular tube and flange was formed in a die by impacting an aluminum slug with a punch. Determine the amount of aluminum necessary to make it. The tube is a full circular part. Its cross section is shown in the figure.



$V =$ _____ mm^3