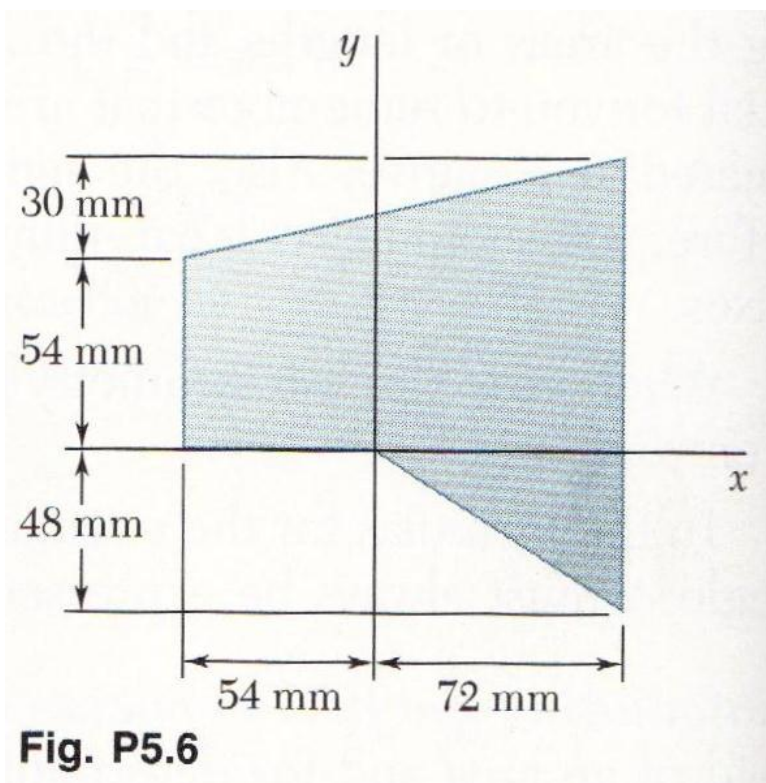
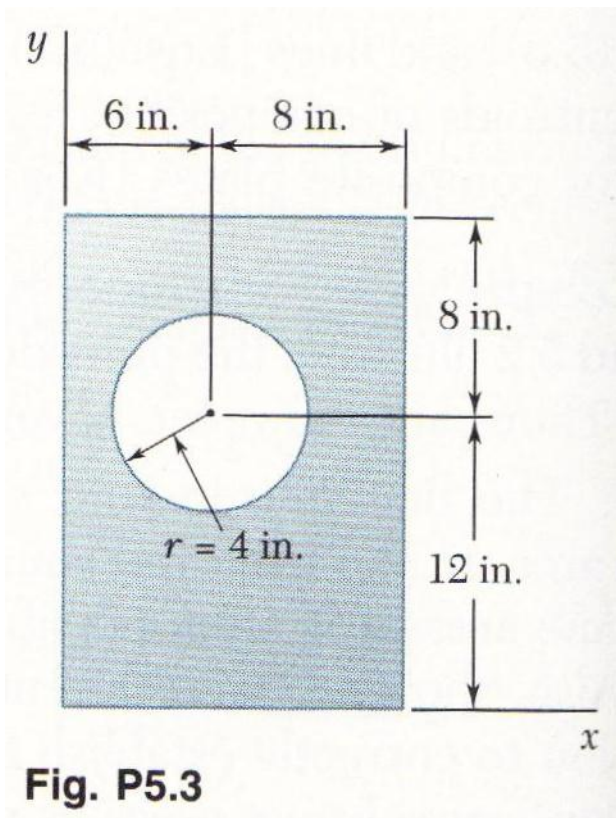


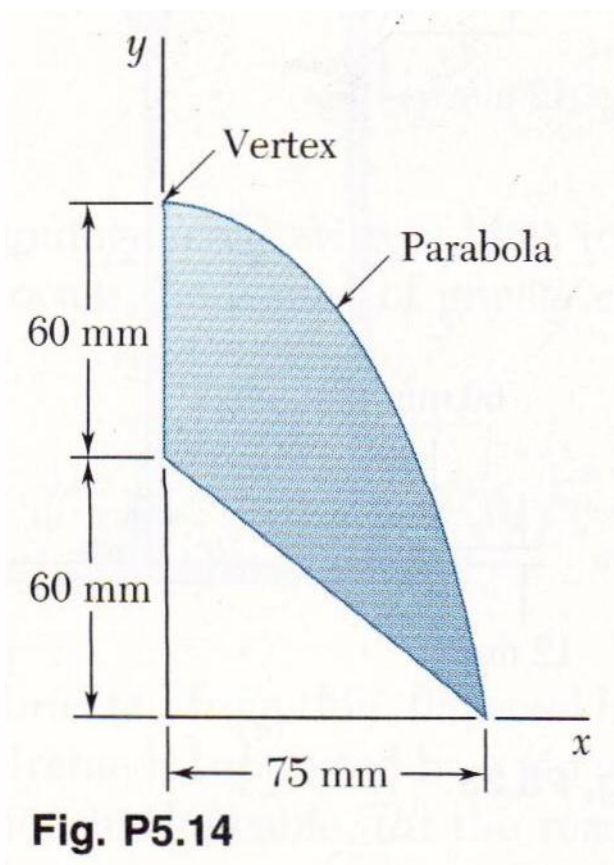
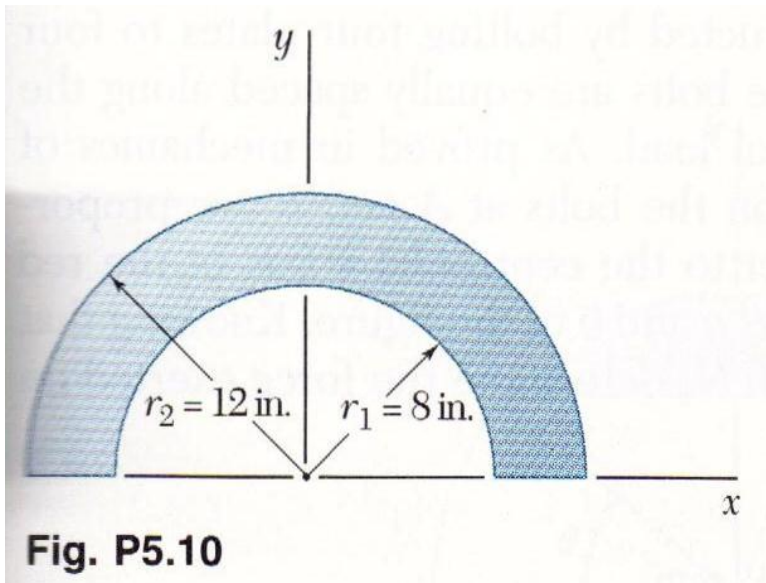
Statics Homework Handout 5:

Homework Assignment 5: 5.14, 5.23, 5.47, 5.76, 5.111, 5.129

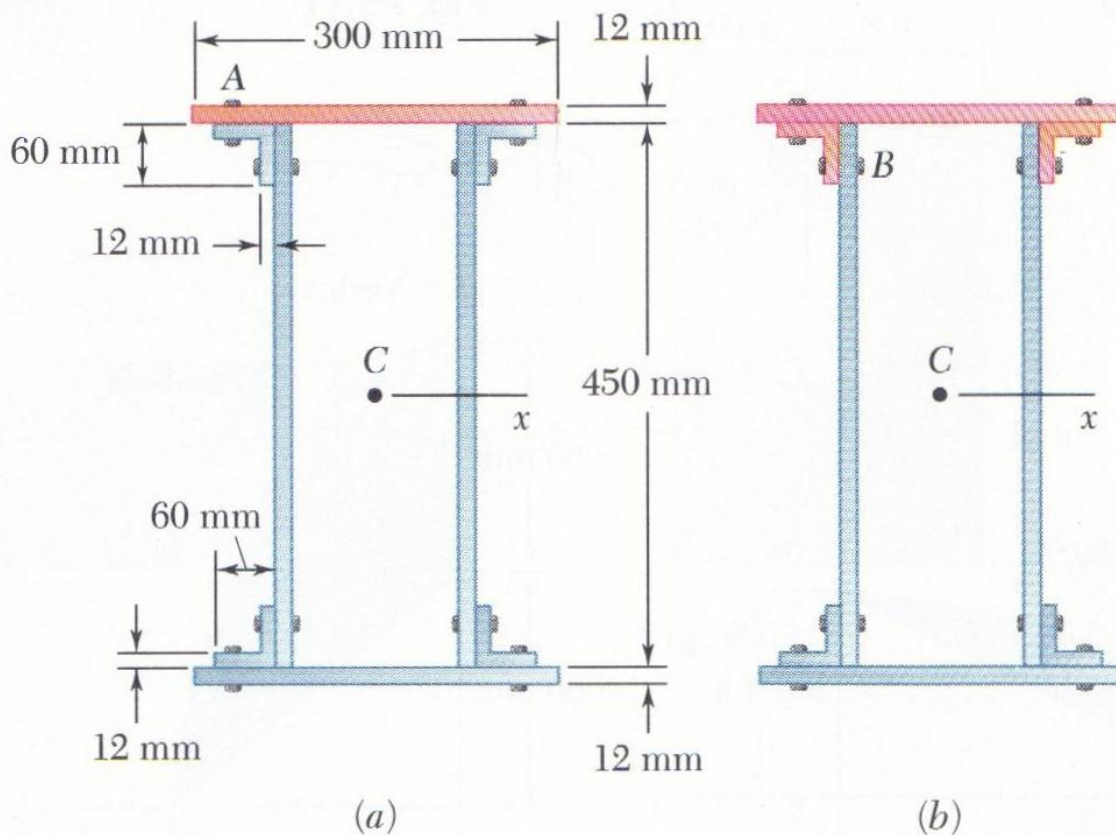
**5.1 through 5.9** Locate the centroid of the plane area shown.



**5.10 through 5.16** Locate the centroid of the plane area shown.

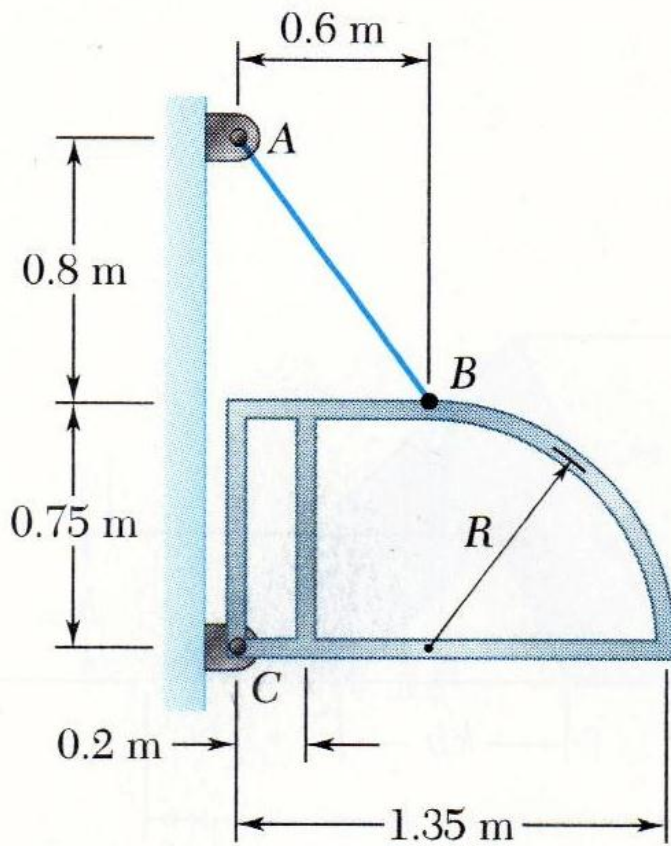


**5.23** A composite beam is constructed by bolting four plates to four  $60 \times 60 \times 12$ -mm angles as shown. The bolts are equally spaced along the beam, and the beam supports a vertical load. As proved in mechanics of materials, the shearing forces exerted on the bolts at  $A$  and  $B$  are proportional to the first moments with respect to the centroidal  $x$  axis of the red shaded areas shown, respectively, in parts  $a$  and  $b$  of the figure. Knowing that the force exerted on the bolt at  $A$  is 280 N, determine the force exerted on the bolt at  $B$ .



**Fig. P5.23**

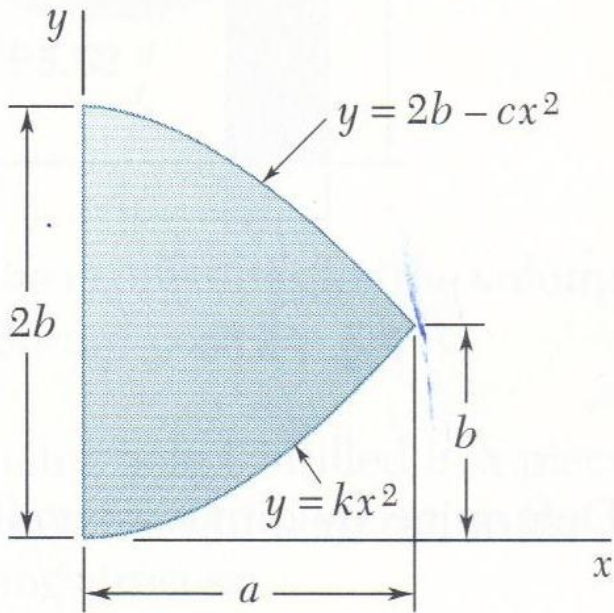
**5.31** The frame for a sign is fabricated from thin, flat steel bar stock of mass per unit length  $4.73 \text{ kg/m}$ . The frame is supported by a pin at  $C$  and by a cable  $AB$ . Determine (a) the tension in the cable, (b) the reaction at  $C$ .



**Fig. P5.31**

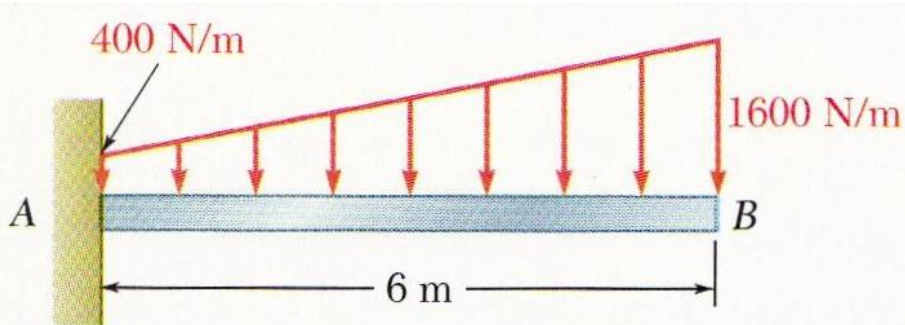


**5.47 and 5.48** Determine by direct integration the centroid of the area shown. Express your answer in terms of  $a$  and  $b$ .

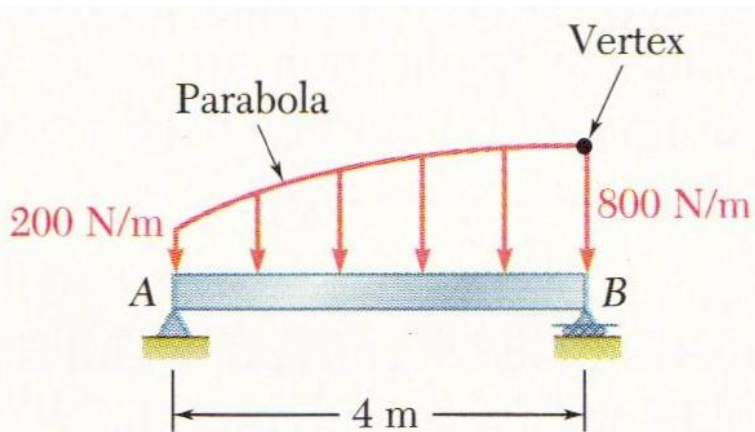


**Fig. P5.47**

**5.75 and 5.76** For the beam and loading shown, determine (a) the magnitude and location of the resultant of the distributed load, (b) the reactions at the beam supports.

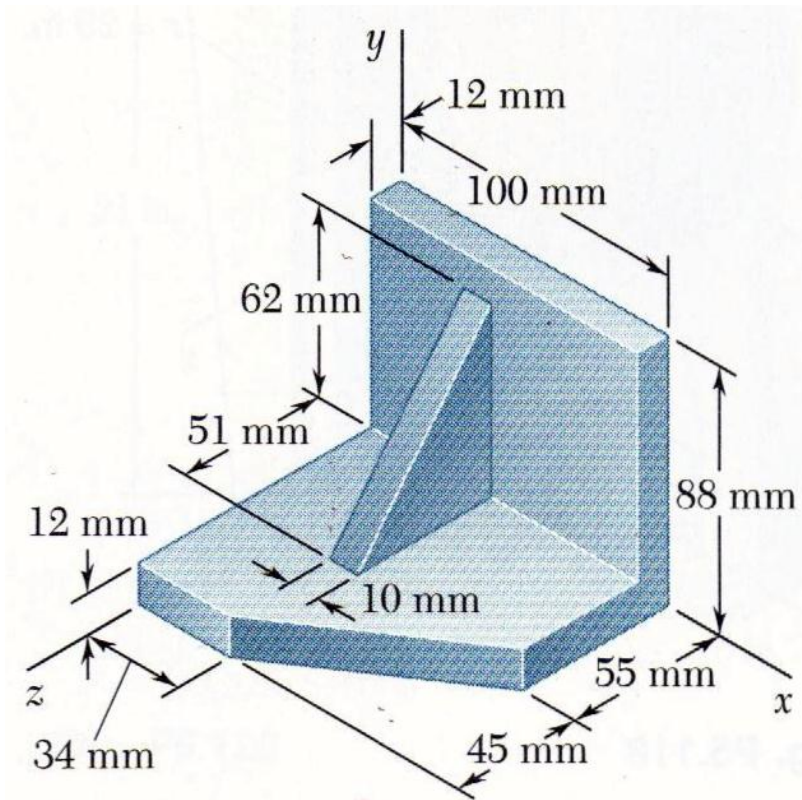


**Fig. P5.75**



**Fig. P5.76**

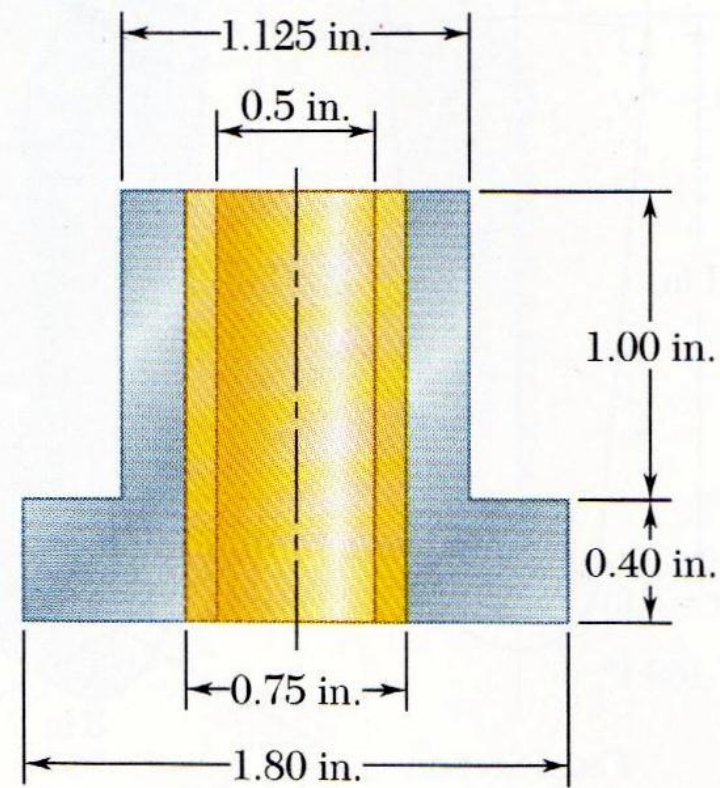
**5.110** For the stop bracket shown, locate the  $x$  coordinate of the center of gravity.



**Fig. P5.110 and P5.111**

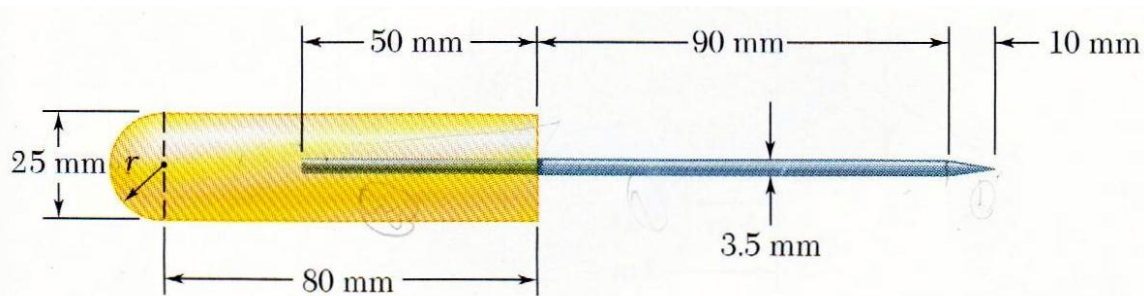
**5.111** For the stop bracket shown, locate the  $z$  coordinate of the center of gravity.

**5.128** A bronze bushing is mounted inside a steel sleeve. Knowing that the specific weight of bronze is  $0.318 \text{ lb/in}^3$  and of steel is  $0.284 \text{ lb/in}^3$ , determine the location of the center of gravity of the assembly.



**Fig. P5.128**

**5.129** A scratch awl has a plastic handle and a steel blade and shank. Knowing that the density of plastic is  $1030 \text{ kg/m}^3$  and of steel is  $7860 \text{ kg/m}^3$ , locate the center of gravity of the awl.



**Fig. P5.129**