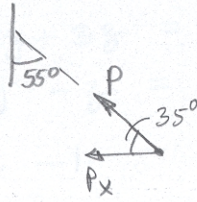
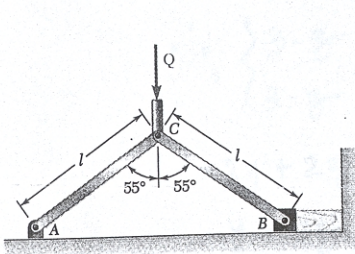


Name: Key
 ID #: _____

MECH 3130: Mechanics of Materials
Spring 2003
Quiz #1 (Pre-requisites Quiz)

1. Member CB of the vise shown exerts on block B a force P directed along line CB. Knowing that P must have a 1200 N horizontal component, determine (a) the magnitude of force P , (b) its vertical component.

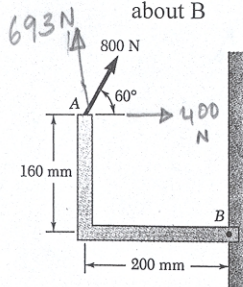


$$P \cos 35^\circ = 1200$$

$$P = 1465 \text{ N}$$

$$P \sin 35^\circ = 840 \text{ N} = P_y$$

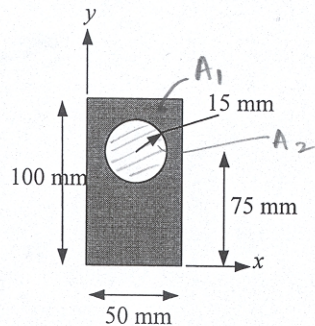
2. A force of 800 N acts on a bracket as shown. Determine the moment of the force about B.



$$693(0.2) + 400(0.16)$$

$$M_B = 202.6 \text{ N}\cdot\text{m}$$

3. Find the centroid of the shaded area with respect to y-axis.



$$\bar{y} = \frac{A_1 \bar{y}_1 + A_2 \bar{y}_2}{A_2 + A_1}$$

In this case A_2 is negative

$$\bar{y} = \frac{(50 \times 100) 50 - (\pi \cdot 15^2) 75}{(50 \times 100) - (\pi \cdot 15^2)}$$

$$= 45.9 \text{ mm}$$

4. Find solution to a set of three linear equations: $x + 2y + 3z = 2$ is,
 $x + z = 3$
 $x + y - z = 1$

$$x = 3 - z$$

$$\therefore \begin{cases} 3 - z + 2y + 3z = 2 \\ 3 - z + y - z = 1 \end{cases}$$

$$2y + 2z = -1$$

$$y - 2z = -2$$

$$3y = -3 \quad \underline{\underline{y = -1}}$$

$$\therefore \underline{\underline{z = +\frac{1}{2}}}$$

$$\underline{\underline{x = 3 - \frac{1}{2} = \frac{5}{2}}}$$