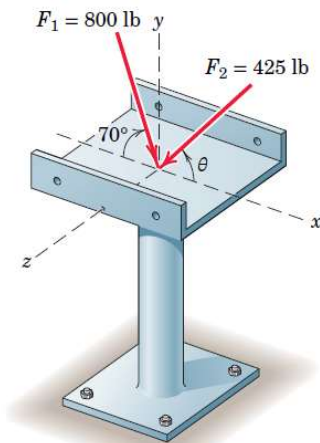


Solution of Problem 2/6 Finding Vertical resultant of concentric forces.

2/6 Two forces are applied to the construction bracket as shown. Determine the angle θ which makes the resultant of the two forces vertical. Determine the magnitude R of the resultant.

2/6 Two forces are applied to the construction bracket as shown. Determine the angle θ which makes the resultant of the two forces vertical. Determine the magnitude R of the resultant.



PROBLEM 2/6

Solution:

1. Determine the angle θ :
Since the resultant is vertical, there will be no net force along x-axis.
i.e. $\sum F_x = 0$:
 $\Rightarrow F_1 \cos(70^\circ) - F_2 \cos(\theta) = 0$
 $\Rightarrow 800 \cos(70^\circ) - 425 \cos(\theta) = 0$
 $\Rightarrow \theta \approx 49.9^\circ$

2. Find the magnitude of Resultant force $|R|$:
Since the resultant is vertical, it will be equal to the sum of vertical components of F_1 and F_2
i.e. $R = \sum F_y = F_1 \sin 70^\circ + F_2 \sin(49.9^\circ)$
 $\Rightarrow R = 800 \sin 70^\circ + 425 \sin(49.9^\circ) = 1076.846 \text{ lb}$
 $\Rightarrow R \approx 1076.85 \text{ lb (downward)}$
 $\Rightarrow |R| \approx 1076.85 \text{ lb}$

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