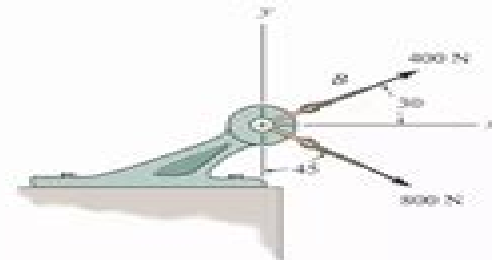


2-25.

Determine the magnitude of the resultant force and its direction, measured clockwise from the positive x axis.



Solution

Scalar Notation. Summing the force components along x and y axes by referring to Fig. *a*,

$$\Sigma (F_x)_x = \Sigma F_x; \quad (F_R)_x = 400 \cos 30^\circ + 800 \sin 45^\circ = 912.10 \text{ N} \quad \Sigma$$

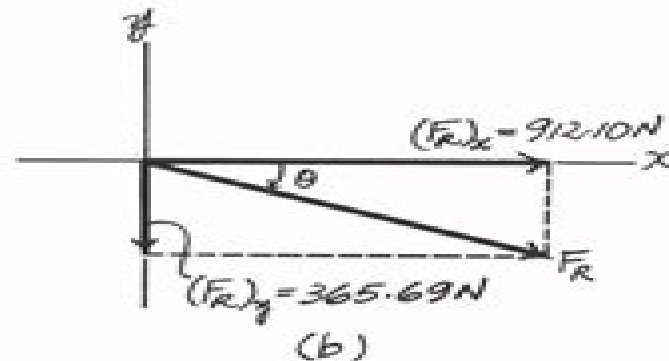
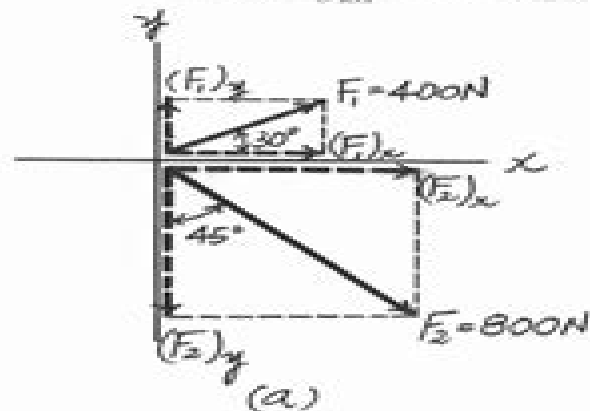
$$+\circ (F_x)_y = \Sigma F_y; \quad (F_R)_y = 400 \sin 30^\circ - 800 \cos 45^\circ = -365.69 \text{ N} = 365.69 \text{ N} \quad \Sigma$$

Referring to Fig. *b*, the magnitude of the resultant force is

$$F_R = \sqrt{(F_R)_x^2 + (F_R)_y^2} = \sqrt{912.10^2 + 365.69^2} = 982.67 \text{ N} = 983 \text{ N} \quad \text{Ans.}$$

And its directional angle θ measured clockwise from the positive x axis is

$$\theta = \tan^{-1} \frac{(F_R)_y}{(F_R)_x} = \tan^{-1} \frac{365.69}{912.10} = 21.84^\circ = 21.8^\circ \quad \text{Ans.}$$



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