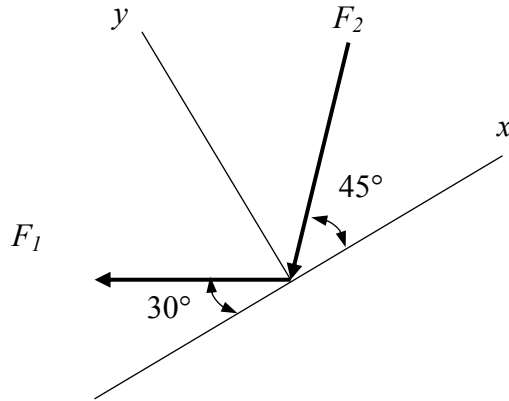


19. Two Forces are independently and normally distributed with  $F_1 \sim N(300, 5^2)$  N and  $F_2 \sim N(400, 8^2)$  N, respectively. Determine the resultant forces in  $x$  and  $y$  axes.



**Solution**

For  $x$  axis,

$$\mu_{F_x} = -\mu_{F_1} \cos 30^\circ - \mu_{F_2} \cos 45^\circ = -542.65 \text{ N}$$

$$\sigma_{F_x} = \sqrt{(\sigma_{F_1} \cos 30^\circ)^2 + (\sigma_{F_2} \cos 45^\circ)^2} = 7.12 \text{ N}$$

For  $y$  axis,

$$\mu_{F_y} = \mu_{F_1} \sin 30^\circ - \mu_{F_2} \sin 45^\circ = -132.84 \text{ N}$$

$$\sigma_{F_y} = \sqrt{(\sigma_{F_1} \sin 30^\circ)^2 + (\sigma_{F_2} \sin 45^\circ)^2} = 6.18 \text{ N}$$

Thus,  $F_x \sim N(-542.65, 7.12^2)$  N and  $F_y \sim N(-132.84, 6.18^2)$  N. **(Ans.)**