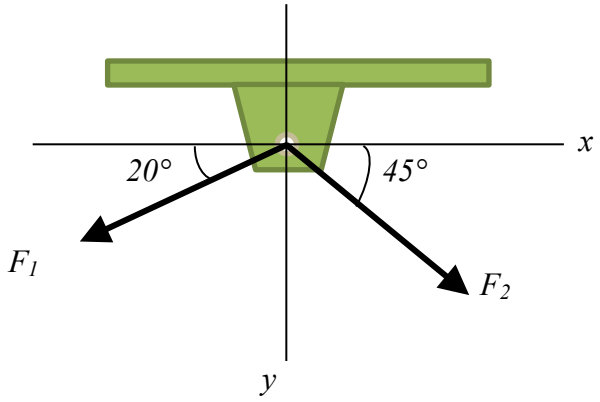
17. Determine the magnitude of the resultant force in both x and y directions if $F_1 \sim N(450, 10^2)$ N and $F_2 \sim N(900, 20^2)$ N.



Solution

We know $F_1 \sim N(450, 10^2)$ N and $F_2 \sim N(900, 20^2)$ N. For x direction

$$\mu_{F_x} = \mu_{F_2} \cos 45^\circ - \mu_{F_1} \cos 20^\circ = 213.53 \text{ N}$$

$$\sigma_{F_x} = \sqrt{\left(\sigma_{F_2} \cos 45^\circ\right)^2 + \left(\sigma_{F_1} \cos 20^\circ\right)^2} = 16.98 \text{ N}$$

For y direction

$$\mu_{F_y} = \mu_{F_2} \sin 45^\circ + \mu_{F_1} \sin 20^\circ = 790.31 \text{ N}$$

$$\sigma_{F_y} = \sqrt{\left(\sigma_{F_2} \sin 45^\circ\right)^2 + \left(\sigma_{F_1} \sin 20^\circ\right)^2} = 14.55 \text{ N}$$

Therefore, $F_x \sim N(213.53, 16.98^2)$ N and $F_y \sim N(790.31, 14.55^2)$ N.