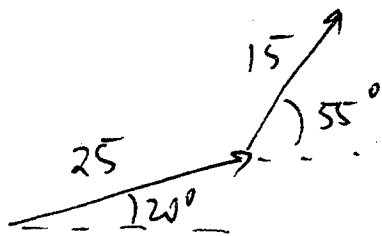


Tuesday 1pm Contact Class

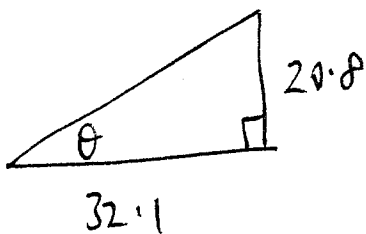


Find the resultant force & direction.

One way Resultant force, $F = (25 \cos 20^\circ \hat{i} + 25 \sin 20^\circ \hat{j}) + (15 \cos 55^\circ \hat{i} + 15 \sin 55^\circ \hat{j})$

$$= (25 \cos 20^\circ \hat{i} + 15 \cos 55^\circ \hat{i}) + (25 \sin 20^\circ \hat{j} + 15 \sin 55^\circ \hat{j})$$
$$\approx 32.1 \hat{i} + 20.8 \hat{j}$$

$$\|F\| \approx \sqrt{32.1^2 + 20.8^2}$$
$$\approx 38.2 \text{ N}$$

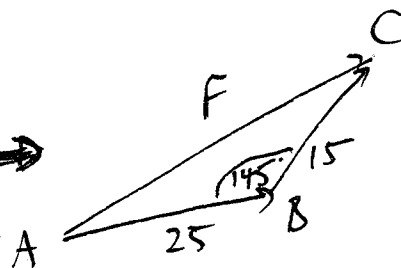


$$\theta \approx \tan^{-1}\left(\frac{20.8}{32.1}\right)$$
$$\approx 32.9^\circ$$

So the resultant force has a magnitude of $\approx 38.2 \text{ N}$ & a direction of approx. 32.9° .

Another way

Using cos rule $\Rightarrow$



$$F^2 = 25^2 + 15^2 - 2 \cdot 25 \cdot 15 \cos 145^\circ$$
$$\approx 1464.36$$

$$\therefore F \approx 38.3 \text{ N}$$

Using sine rule $\Rightarrow \frac{\sin A}{15} \approx \frac{\sin 145^\circ}{38.3}$

$$\therefore A \approx \sin^{-1}\left(\frac{15 \sin 145^\circ}{38.3}\right)$$
$$\approx 13.0^\circ \therefore \text{angle} \approx 20 + 13 \approx 33^\circ$$