

Q.01 A force  $\mathbf{F}$  has magnitude of 15 N. It is directed along the negative  $x$ -axis towards positive  $y$ -axis. Represent

**Solution** The given force is as shown in figure. Let us find  $x$  and  $y$  components.

$$\begin{aligned}F_x &= F \cos 37^\circ \\&= 15 \times \frac{4}{5} \\&= 12 \text{ N} \quad (\text{along negative } x\text{-axis})\end{aligned}$$

$$\begin{aligned}F_y &= F \sin 37^\circ \\&= 15 \times \frac{3}{5} \\&= 9 \text{ N} \quad (\text{along positive } y\text{-axis})\end{aligned}$$

From parallelogram law of vector addition, we can see that

$$\begin{aligned}\mathbf{F} &= \mathbf{OM} + \mathbf{ON} \\&= F_x (-\hat{\mathbf{i}}) + F_y (\hat{\mathbf{j}}) \\&= (-12\hat{\mathbf{i}} + 9\hat{\mathbf{j}}) \text{ N}\end{aligned}$$