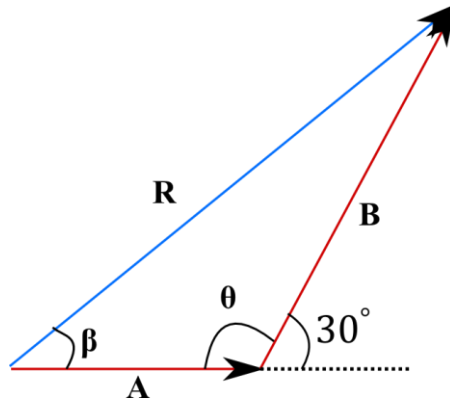


**Answer on Question 51823, Physics, Mechanics | Kinematics | Dynamics**

**Question:**

A man walks  $5.0m$  due east and then  $10m\ N30^\circ E$ . Find his resultant displacement?

**Solution:**



The displacement **R** is the resultant when the two individual displacements **A** and **B** are added. We can find the magnitude of the resultant displacement **R** from the law of cosines applied to the triangle:

$$\theta = 180^\circ - 30^\circ = 150^\circ,$$

$$R = \sqrt{A^2 + B^2 - 2AB\cos\theta} = \sqrt{(5m)^2 + (10m)^2 - 2 \cdot 5m \cdot 10m \cdot \cos 150^\circ} = 14.6m.$$

Then, we can find the direction of the resultant displacement **R** from the law of sines:

$$\frac{\sin\beta}{B} = \frac{\sin\theta}{R},$$

$$\sin\beta = \frac{B}{R}\sin\theta = \frac{10m}{14.6m} \cdot \sin 150^\circ = 0.3425,$$

$$\beta = \arcsin(0.3425) = 20^\circ.$$

**Answer:**

The magnitude of the resultant displacement is  $R = 14.6m$ , direction is  $N20^\circ E$ .