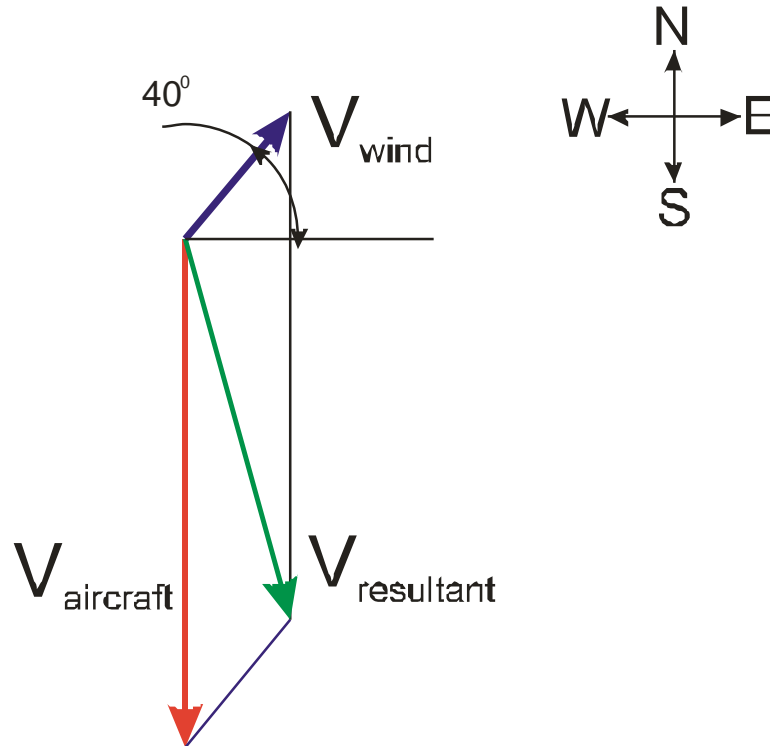


A jet aircraft is aimed south and travelling 851km/h. A wind blows the plane from 40 degrees N of E at 36km/h. What is the plane's resultant velocity?

Solution:



The resultant velocity is as vector sum:

$$\vec{v}(\text{resultant}) = \vec{v}(\text{aircraft}) + \vec{v}(\text{wind})$$

According to the parallelogram rule:

$$|\vec{v}(\text{resultant})| = \sqrt{|\vec{v}(\text{aircraft})|^2 + |\vec{v}(\text{wind})|^2 + 2|\vec{v}(\text{aircraft})| * |\vec{v}(\text{wind})| * \cos\alpha}$$

Where α is the angle between the vectors

$$\alpha = 90^\circ + 40^\circ = 130^\circ$$

$$|\vec{v}(\text{resultant})| = \sqrt{851^2 + 36^2 + 2 * 851 * 36 * \cos(130^\circ)}$$

$$|\vec{v}(\text{resultant})| = 828,32 \text{ km/h}$$

Answer: the resultant velocity is 828 km/h.