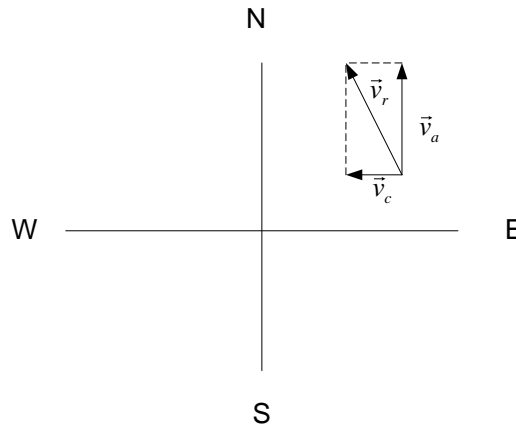


If an airplane is flying directly north at 300.0 km/h, and a crosswind is hitting the airplane at 50.0 km/h from the east, what is the airplane's resultant velocity?

Solution.



The resultant velocity \vec{v}_r is the vector addition of the airplane's velocity \vec{v}_a and the crosswind's velocity \vec{v}_c . The vector addition is given by the parallelogram law and the module

$$|\vec{v}_r| \text{ is given by Pythagora's theorem: } |\vec{v}_r| = \sqrt{|\vec{v}_a|^2 + |\vec{v}_c|^2} = \sqrt{300^2 + 50^2} = 304.14 \text{ km/h.}$$

The direction of the resultant velocity is the Northwest.

Answer: 304.14 km/h.