

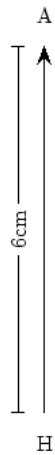
Answer on Question #60664-Physics-Other

A ship leaves the harbor and it sails 6 kilometers north to port A. From here the ship travels 12 kilometers East to port B before sailing 5.5 kilometers south West to east. Determine the resultant displacement.

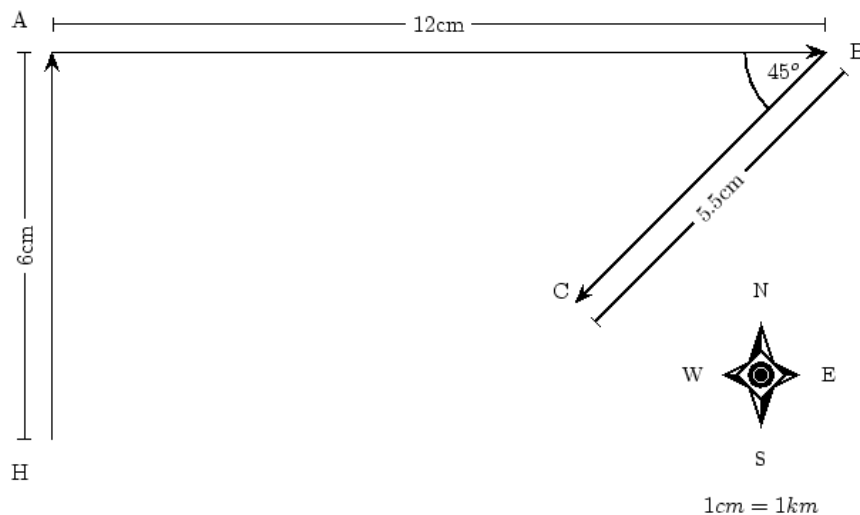
Solution

Let's determine the ship's resultant displacement using the tail-to-head technique of vector addition.

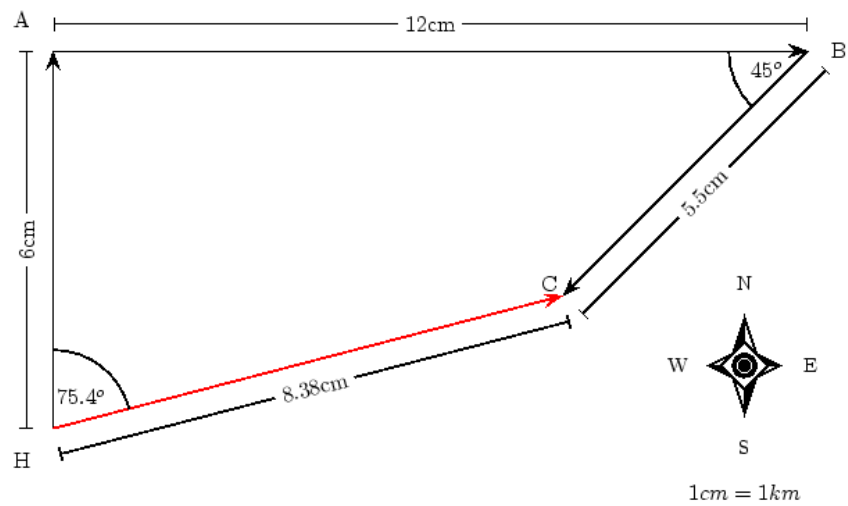
Construction Step 1: Starting at the harbor H we draw the first vector 6cm long in the direction north (remember in the diagram 1cm represents 1km):



Construction Step 3: Since the ship is now at port B we draw the third vector 5.5cm long starting from this point in the direction south-west. A protractor is required to measure the angle of 45° .



Construction Step 4: As a final step we draw the resultant displacement from the starting point (the harbor H) to the end point (port C). We use a ruler to measure the length of this arrow and a protractor to determine its direction



We now use the scale to convert the length of the resultant in the scale diagram to the actual displacement in the problem. Since we have chosen a scale of $1\text{ cm} = 1\text{ km}$ in this problem the resultant has a magnitude of 8.38 km . The direction can be specified in terms of the angle measured either as 75.4° east of north or on a bearing of 75.4° .

Now we can quote the final answer:

The resultant displacement of the ship is 8.38 km on a bearing of 75.4° .

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