

Answer on Question #52702, Math, Other

A ship travels 84 km on a bearing of 17° , and then travels on a bearing of 107° for 135 km. Find the distance of the end of the trip from the starting point, to the nearest kilometer.

Solution:

First, we need to create the graph of the moving the ship in order to determine the distance of the end of the trip from the starting point. The information is provided in Figure 1.

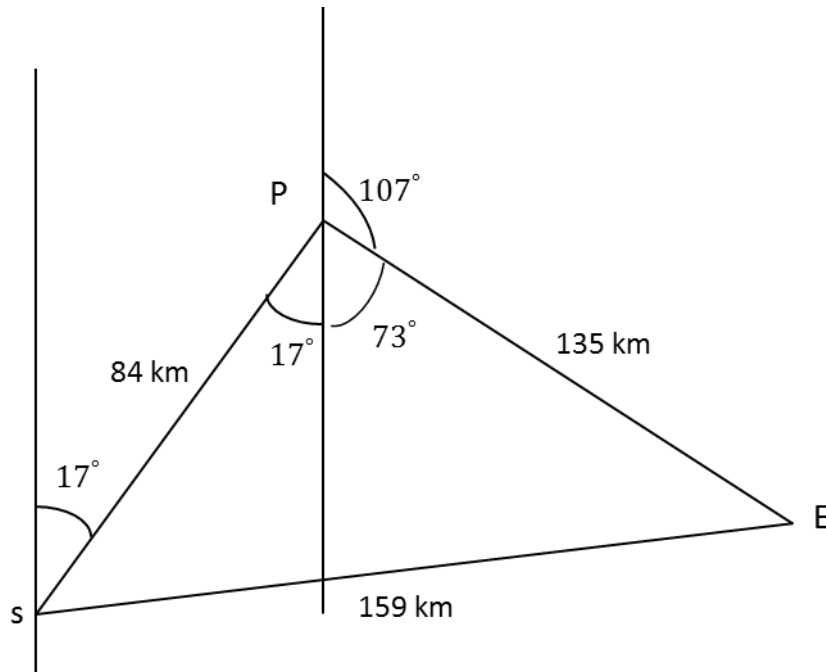


Figure 1 The graph of the ship traffic.

The x-coordinate of the final point is $84\cos(17) + 135\cos(107) = 80.32959 - 39.470 = 40.859$

The y-coordinate of the final point is $84 \cdot \sin(17) + 135 \cdot \sin(107) = 24.559 + 126.101 = 153.660$

From the diagram we can see that we obtain a right-angled triangle. Thus, we can apply the Pythagoras' theorem in order to determine the distance:

$$c^2 = a^2 + b^2$$

In our case the distance is the hypotenuse, then, we will get the following:

$$d^2 = SP^2 + PE^2 = (84)^2 + (135)^2 = 7056 + 18225 = 25281$$

Now, we can find the distance from the noted above equation.

$$d = \sqrt{25281} = 159 \text{ km}$$

Thus, we can conclude that the distance of the end of the trip from the starting point is equal to 159 km.