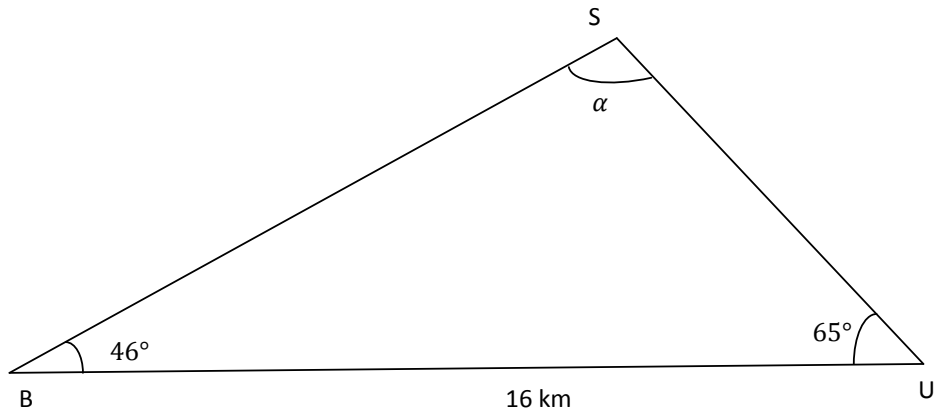A ship s is slighted from the lighthouse B and U which are 16 km apart. If angle SBU = 46 and angle SUB = 65. Find the distance from s to the nearest lighthouse.

Solution:

Because

$$\alpha + 46° + 65° = 180°$$

then

$$\alpha = 180° - 46° - 65° = 69°$$

Because $\angle SBU < \angle SUB$ then $SU < SB$. And we have

$$\frac{SU}{sin46°} = \frac{BU}{sin69°} => SU = sin46° \cdot \frac{BU}{sin69°} = sin46° \cdot \frac{16}{sin69°} \approx 12.328 \ (km)$$

Answer:

The nearest lighthouse is at U and

$$SU \approx 12.328 \ (km)$$