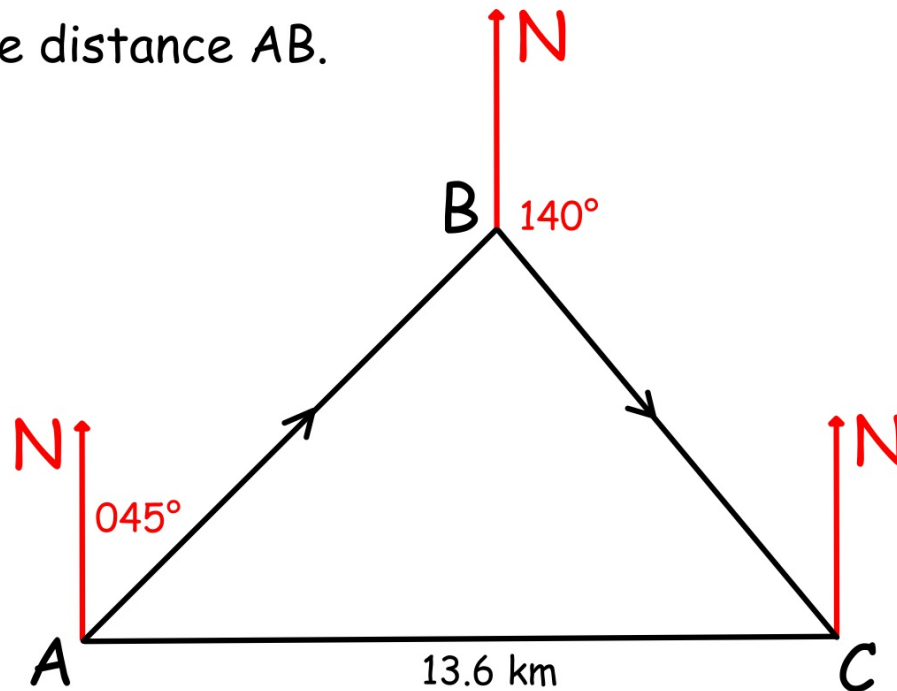


1. A ship travels from A to B on bearing 045° , then from B to C on bearing 140° .

The ship is then 13.6 km East of A.

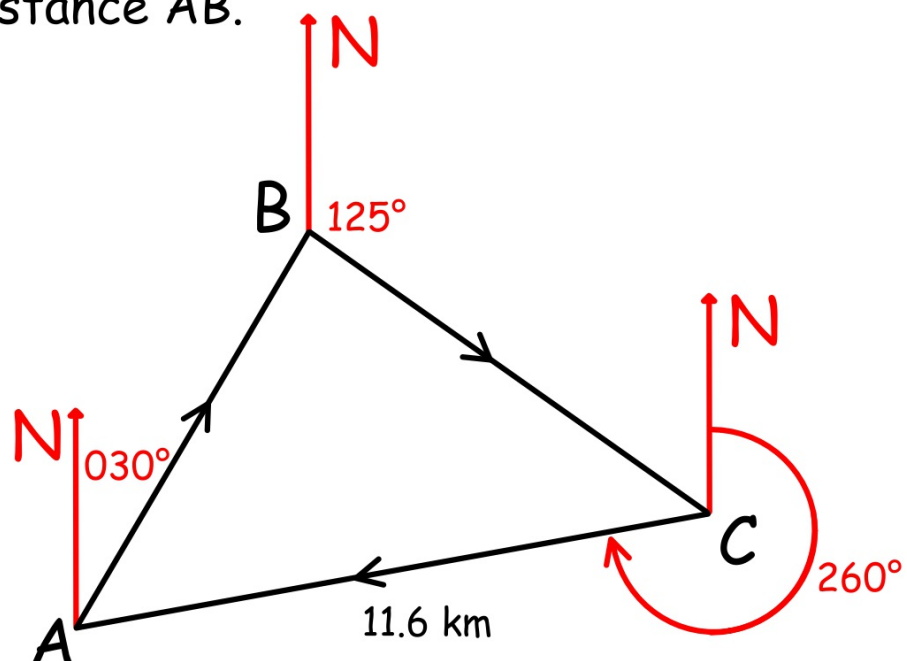
Find the distance AB.



2. A ship travels from A to B on bearing 030° , then from B to C on bearing 125° .

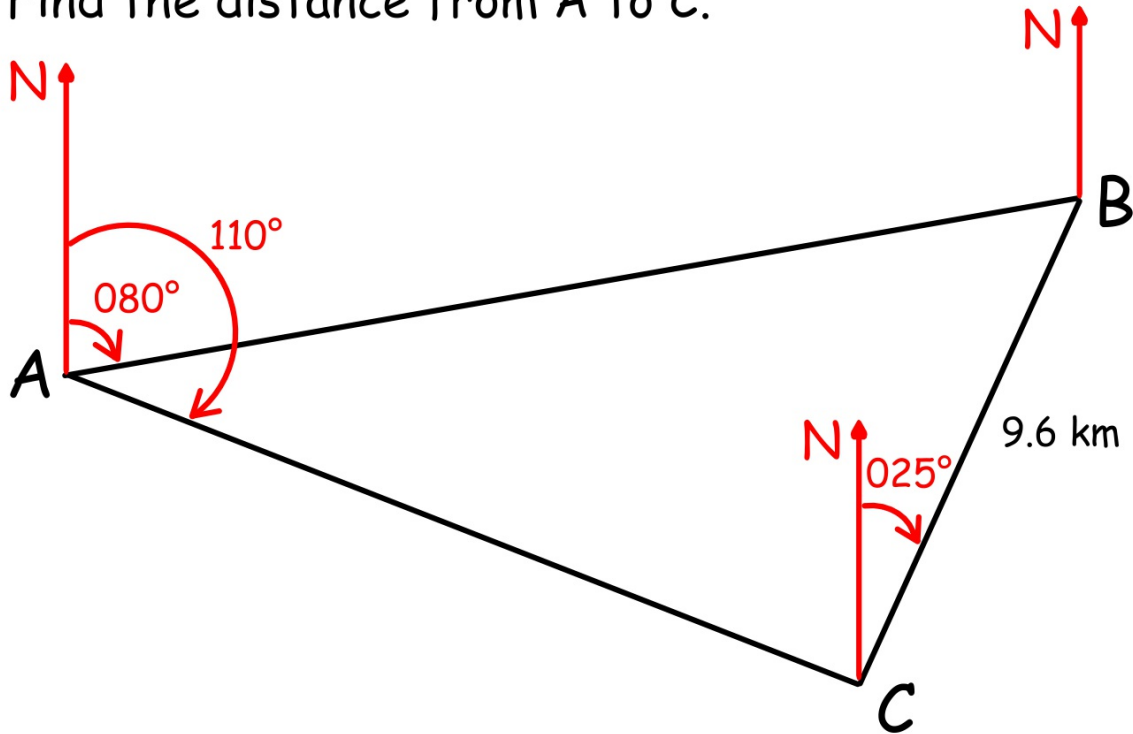
The ship then returns 11.6 km on bearing 260° .

Find the distance AB.



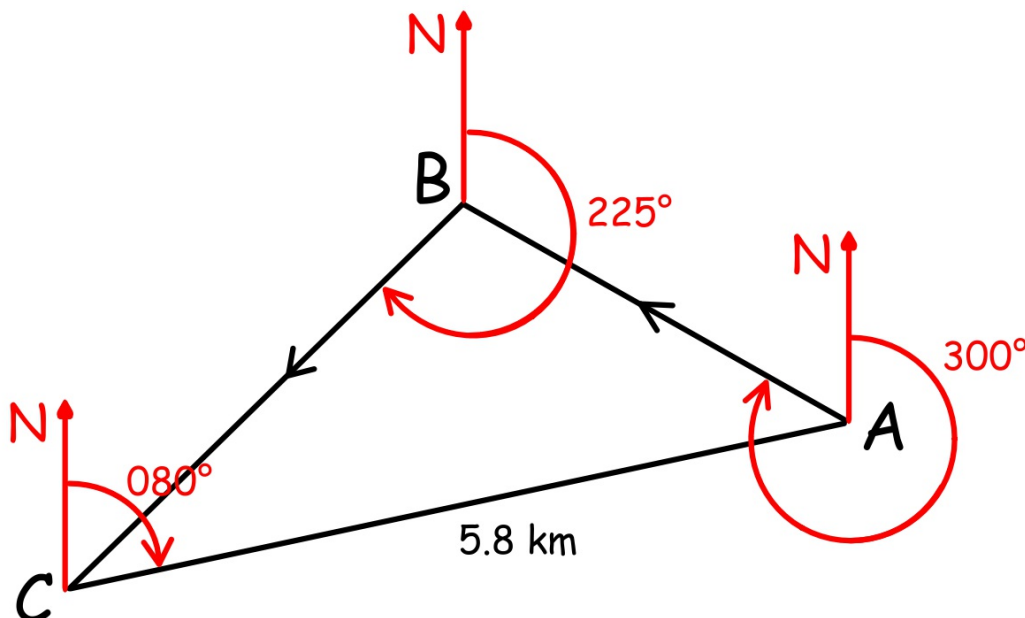
3. From A, B is on bearing 080° and C on bearing 110° .
 From C, B is on bearing 025° .
 The distance between B and C is 9.6 km.

Find the distance from A to C.

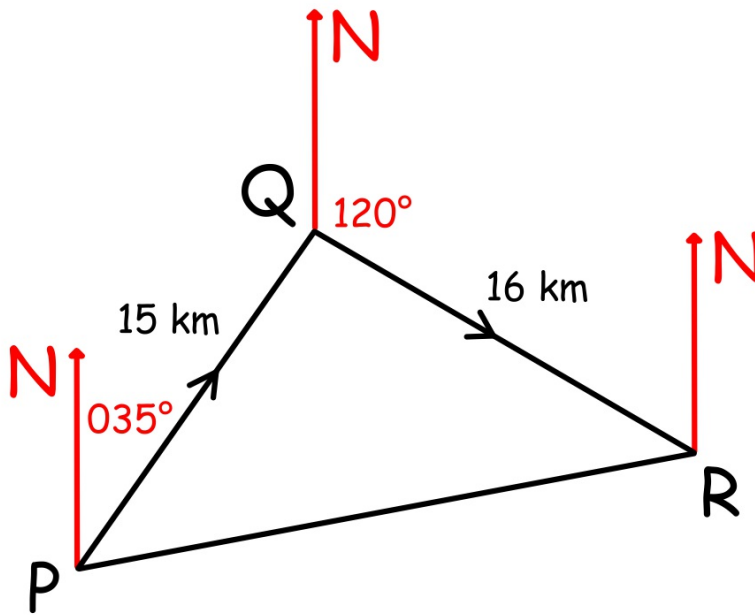


4. A ship travels from A to B on bearing 300° ,
 then from B to C on bearing 225° .
 A is then 5.8 km from C on bearing 080° .

Find the distance from A to B.

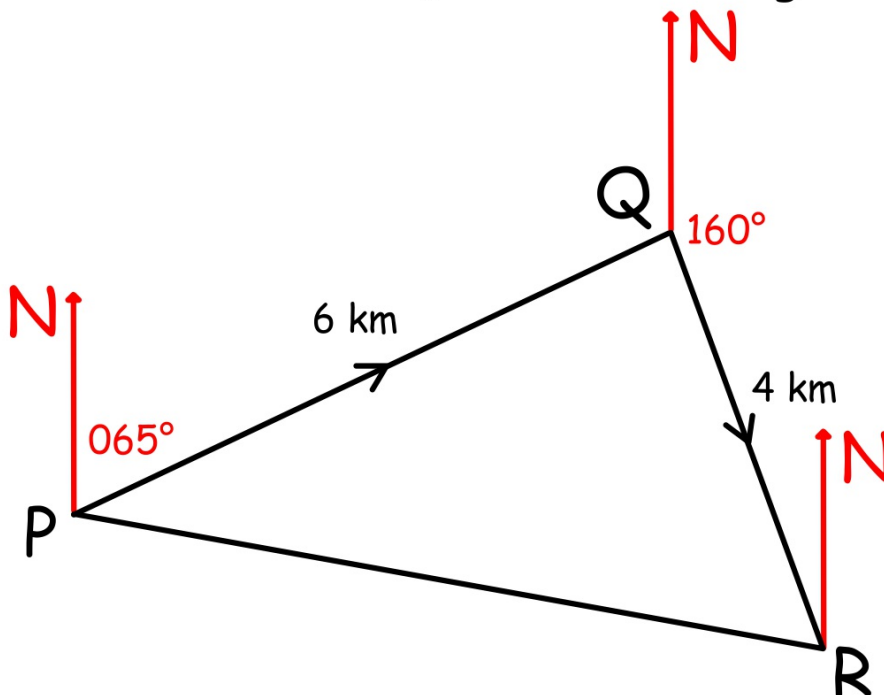


5. A ship travels 15 km from P to Q on bearing 035° , then 16 km from Q to R on bearing 120° .



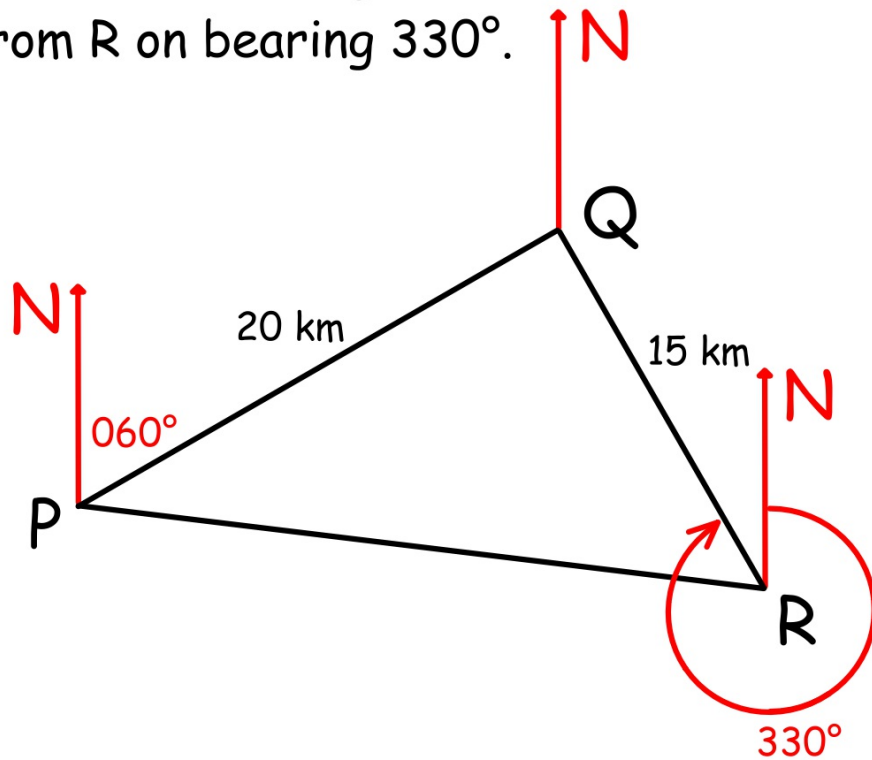
Find the distance and bearing of R from P, and hence find the back-bearing, P from R.

6. A ship travels 6 km from P to Q on bearing 065° , then 4 km from Q to R on bearing 160° .



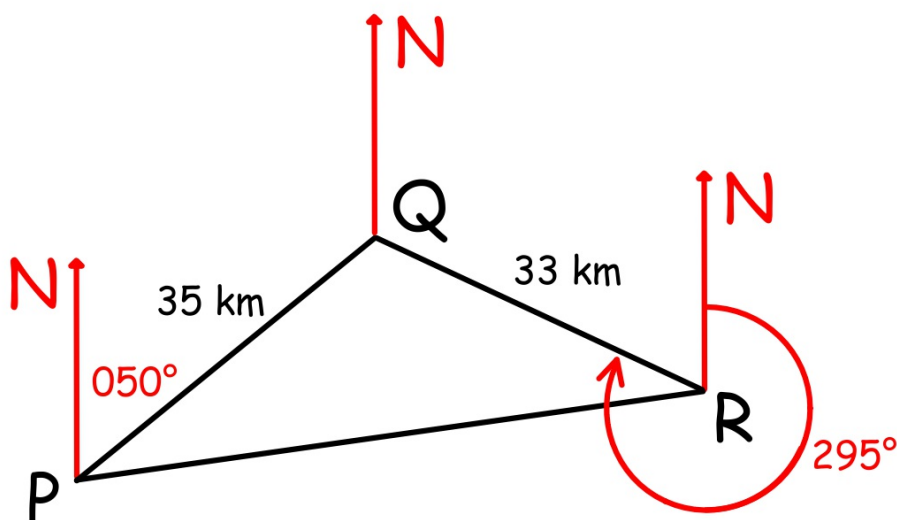
Find the distance and bearing of R from P, and hence find the back-bearing, P from R.

7. Q is 20 km from P on bearing 060° .
 Q is 15 km from R on bearing 330° .



Find the distance and bearing of R from P,
 and hence find the back-bearing, P from R.

8. Q is 35 km from P on bearing 050° .
 Q is 33 km from R on bearing 295° .



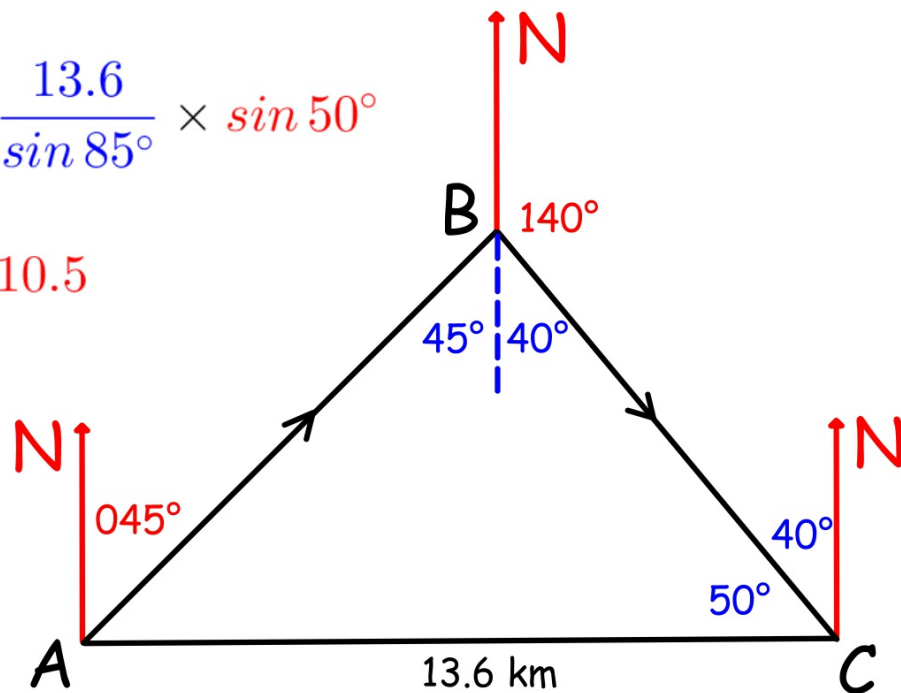
Find the distance and bearing of R from P,
 and hence find the back-bearing, P from R.

1. 10.5 km

$$\frac{AB}{\sin 50^\circ} = \frac{13.6}{\sin 85^\circ}$$

$$AB = \frac{13.6}{\sin 85^\circ} \times \sin 50^\circ$$

$$AB = 10.5$$

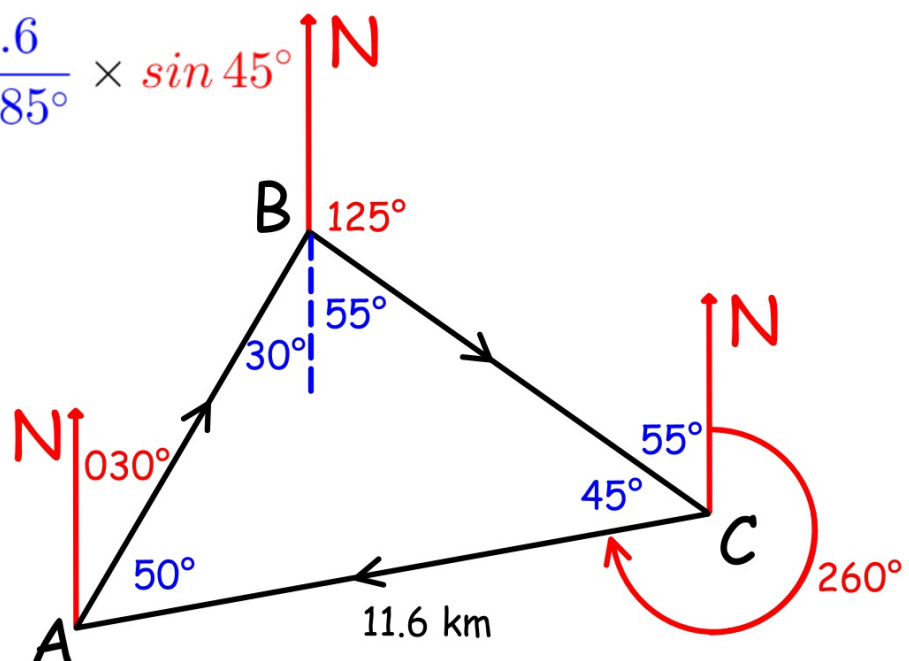


2. 8.2 km

$$\frac{AB}{\sin 45^\circ} = \frac{11.6}{\sin 85^\circ}$$

$$AB = \frac{11.6}{\sin 85^\circ} \times \sin 45^\circ$$

$$AB = 8.2$$

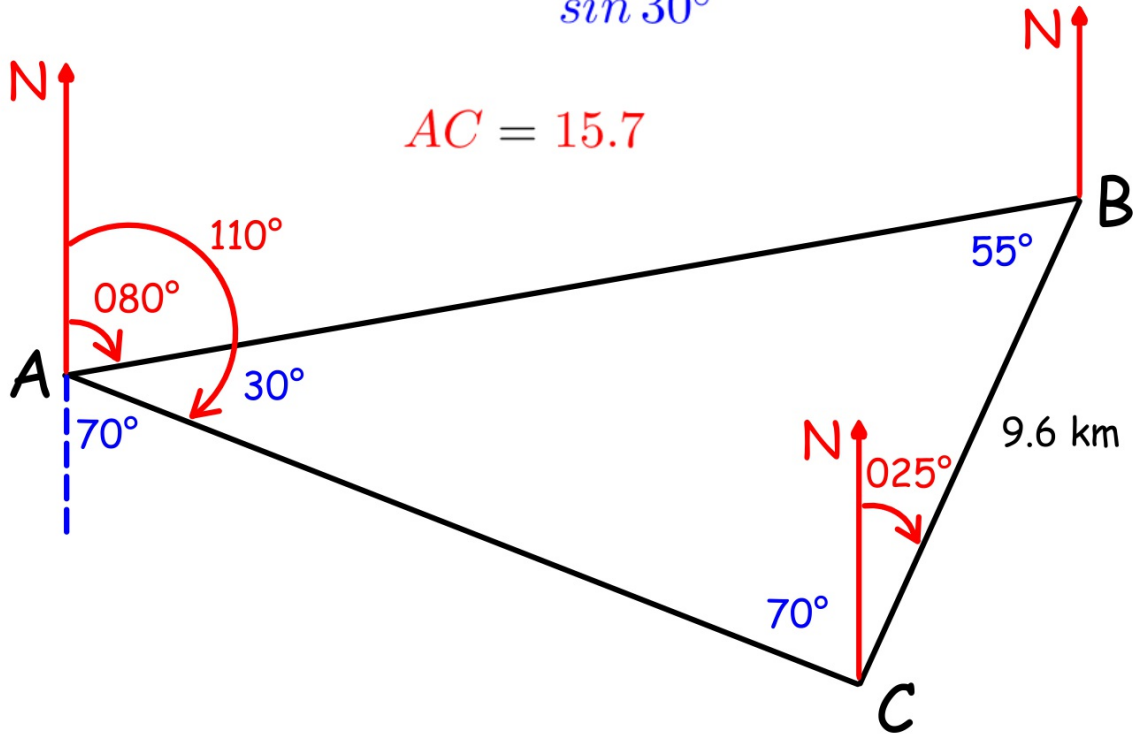


3. 15.7 km.

$$\frac{AC}{\sin 55^\circ} = \frac{9.6}{\sin 30^\circ}$$

$$AC = \frac{9.6}{\sin 30^\circ} \times \sin 55^\circ$$

$$AC = 15.7$$

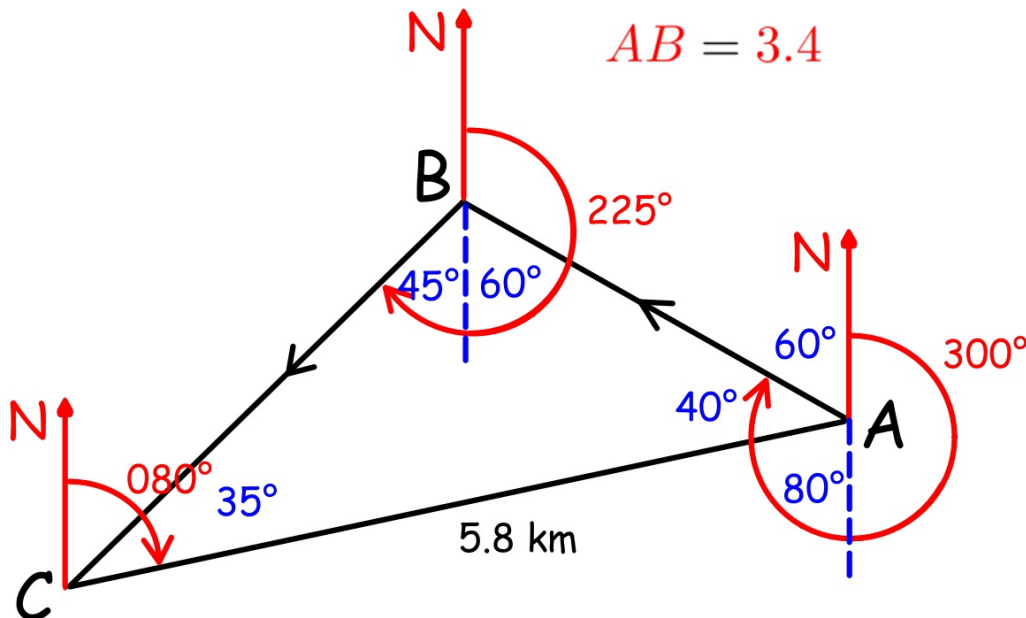


4. 3.4 km

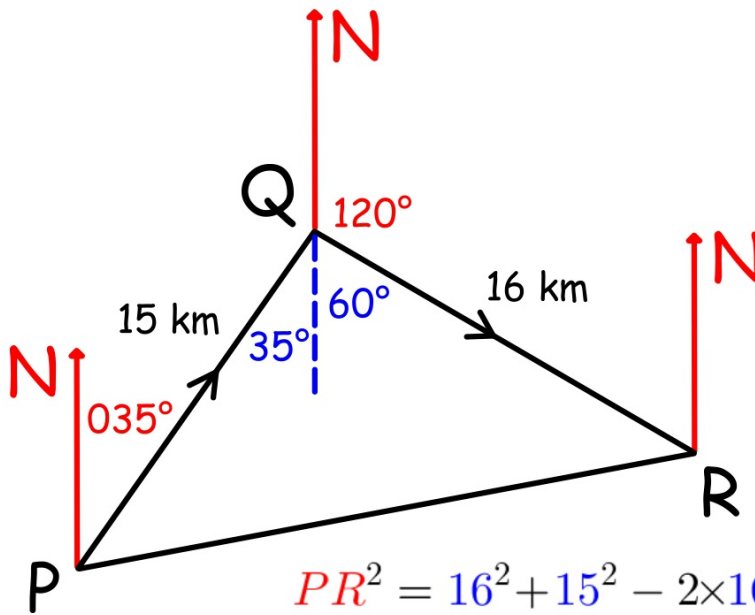
$$\frac{AB}{\sin 35^\circ} = \frac{5.8}{\sin 105^\circ}$$

$$AB = \frac{5.8}{\sin 105^\circ} \times \sin 35^\circ$$

$$AB = 3.4$$



5. 22.9 km , 079° ; 259°



$$PR^2 = 16^2 + 15^2 - 2 \times 16 \times 15 \times \cos 95$$

$$PR^2 = 522.834757$$

$$PR = \sqrt{522.834757} = 22.87$$

$$\frac{\sin P}{16} = \frac{\sin 95^\circ}{22.9}$$

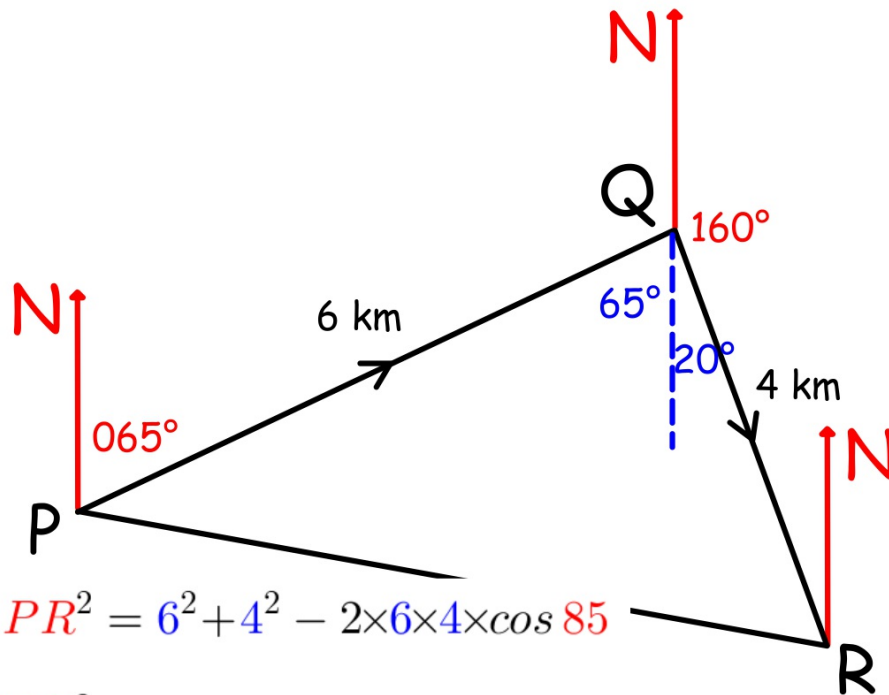
$$\sin P = \frac{\sin 95^\circ}{22.9} \times 16 = 0.6969$$

$$QPR = \sin^{-1}(0.6969) = 44.2^\circ$$

$$035^\circ + 44^\circ = 079^\circ$$

$$079^\circ + 180^\circ = 259^\circ$$

6. 6.9 km , 100° ; 280°



$$PR^2 = 6^2 + 4^2 - 2 \times 6 \times 4 \times \cos 85$$

$$PR^2 = 47.816524$$

$$PR = \sqrt{47.816524} = 6.91$$

$$\frac{\sin P}{4} = \frac{\sin 85^\circ}{6.9}$$

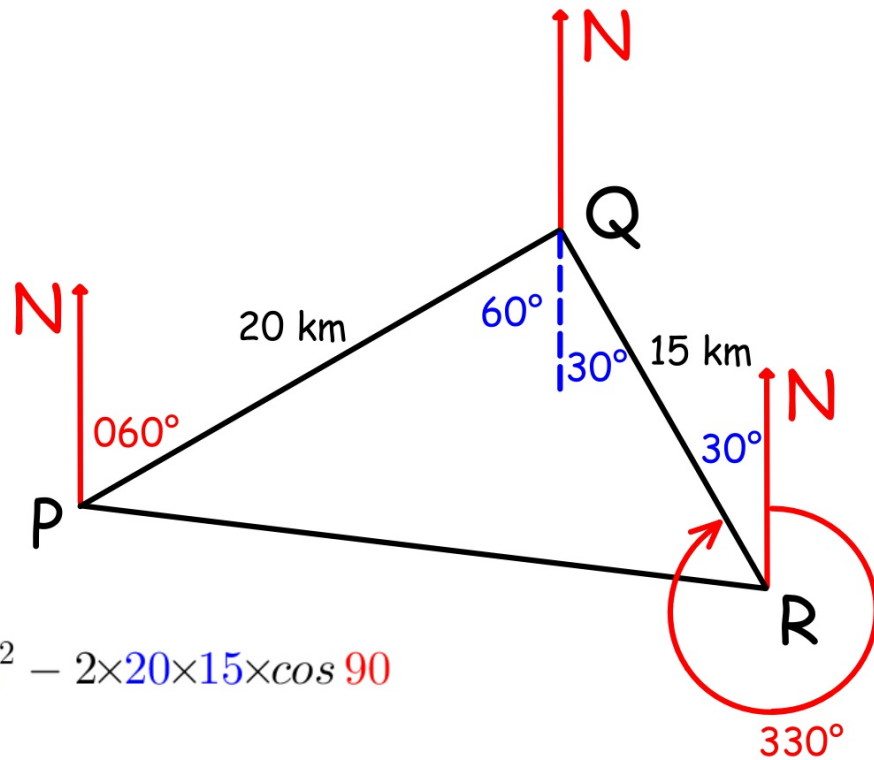
$$\sin P = \frac{\sin 85^\circ}{6.9} \times 4 = 0.5767$$

$$QPR = \sin^{-1}(0.5767) = 35.2^\circ$$

$$65^\circ + 35^\circ = 100^\circ$$

$$100^\circ + 180^\circ = 280^\circ$$

7. 25 km 097° ; 277°



$$PR^2 = 20^2 + 15^2 - 2 \times 20 \times 15 \times \cos 90$$

$$PR^2 = 625.0$$

$$PR = \sqrt{625.0} = 25$$

$$\frac{\sin P}{15} = \frac{\sin 90^\circ}{25}$$

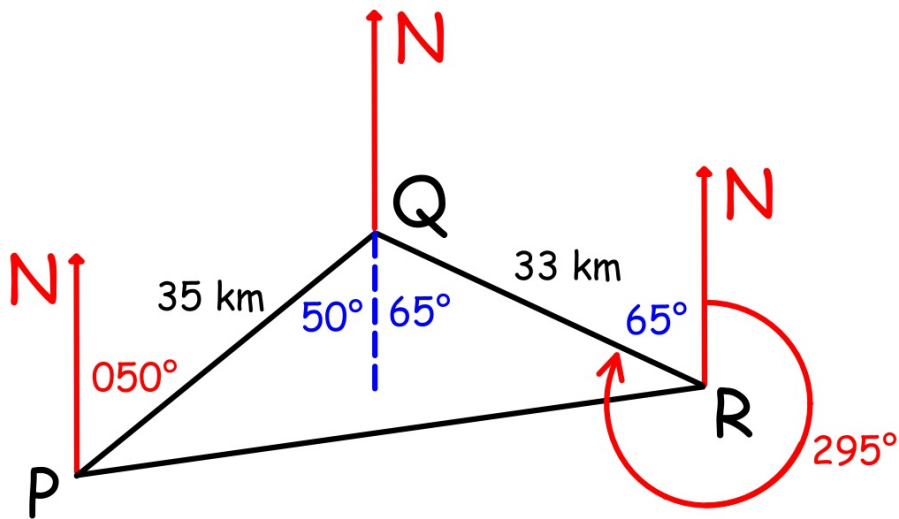
$$\sin P = \frac{\sin 90^\circ}{25} \times 15 = 0.6000$$

$$QPR = \sin^{-1}(0.6000) = 36.9^\circ$$

$$060^\circ + 37^\circ = 097^\circ$$

$$097^\circ + 180^\circ = 277^\circ$$

8. 57.4 km 081° ; 261°



$$PR^2 = 35^2 + 33^2 - 2 \times 35 \times 33 \times \cos 115$$

$$PR^2 = 3290.248185$$

$$PR = \sqrt{3290.248185} = 57.36$$

$$\frac{\sin P}{33} = \frac{\sin 115^\circ}{57.4}$$

$$\sin P = \frac{\sin 115^\circ}{57.4} \times 33 = 0.5214$$

$$QPR = \sin^{-1}(0.5214) = 31.4^\circ$$

$$050^\circ + 31^\circ = 081^\circ$$

$$081^\circ + 180^\circ = 261^\circ$$