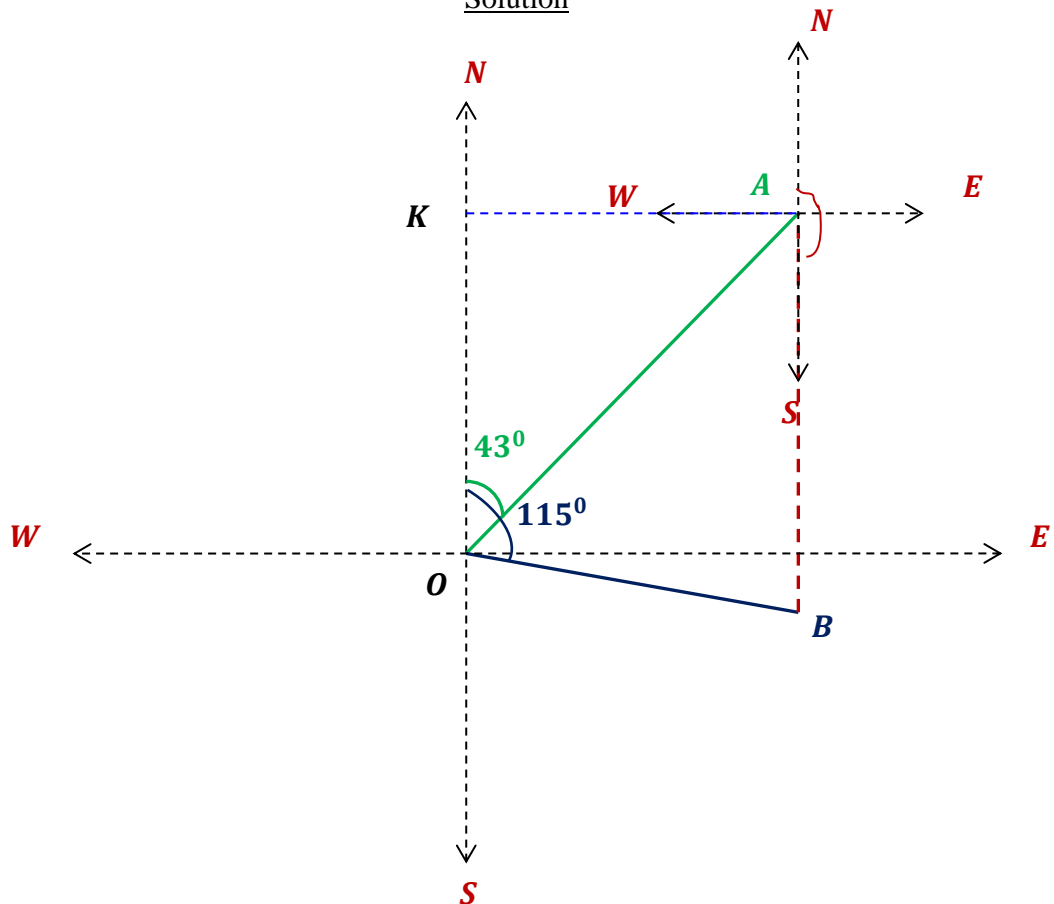# Answer on Question #61717 – Math – Trigonometry

Question

Two surveyors A and B left P at the same time. A moved at a speed of 6 km/hr on a bearing of 043 degrees, while B moved at a speed of 4.5 km/hr on a bearing of 115 degrees. Calculate the distance between A and B after 4 hours and the bearing of B from A.

Solution

1) The distance between A and B

$OA = 6\frac{km}{h} \cdot 4h = 24\ km$,

$OB = 4.5\ km/h \cdot 4h = 18\ km$,

$\angle AOB = 115^0 - 43^0 = 72^0$.

By the cosine theorem,

$AB^2 = OB^2 + OA^2 - 2OB \cdot OA \cdot cos\angle AOB$;

$AB = \sqrt{OB^2 + OA^2 - 2OB \cdot OA \cdot cos\angle AOB}$;

$AB = \sqrt{18^2 + 24^2 - 2 \cdot 18 \cdot 24 \cdot 0.309} = \sqrt{324 + 576 - 266.98} = \sqrt{633,02} = 25.2\ km$

The distance between A and B after 4 hours is 25.2 km.

2) The bearing B from A

$\angle KAO = 90^0 - 43^0 = 47^0$

By the sine theorem,

$$\frac{AB}{sin\angle AOB} = \frac{OB}{sin\angle OAB} \implies sin\angle OAB = \frac{OB}{AB} \cdot sin\angle AOB;$$

$$sin\angle OAB = \frac{18}{25.2} \cdot sin72^0 = \frac{18}{25.2} \cdot 0.951 = 0.679.$$

$$\angle OAB = 43^0.$$

The bearing B from A:

$$270^0 - (47^0 + 43^0) = 180^0$$

The bearing B from A is 180^0.

<u>Answer</u>**: 1**) 25.2 km; **2**) 180^0.