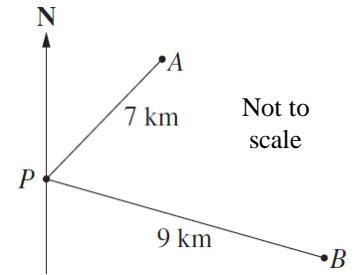


**20 15 MA** Mr Ali, Ms Brown and a group of students were camping at the site located at  $P$ .

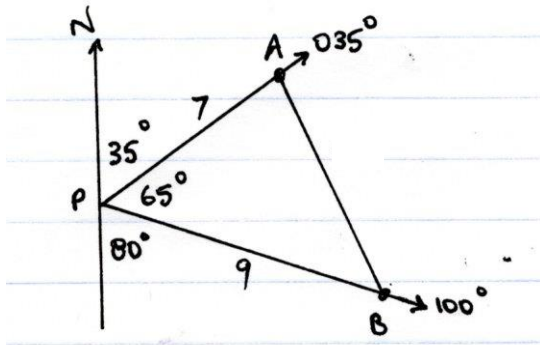
Mr Ali walked with some of the students on a bearing of  $035^\circ$  for 7 km to location  $A$ .

Ms Brown, with the rest of the students, walked on a bearing of  $100^\circ$  for 9 km to location  $B$ .



- (a) Show that the angle  $APB$  is  $65^\circ$ . **1**
- (b) Find the distance  $AB$ . **2**
- (c) Find the bearing of Ms Brown's group from Mr Ali's group. Give your answer correct to the nearest degree. **2**

(a) As  $100 - 35 = 65$ , then angle  $APB = 65^\circ$ . ✓



(b) Using cosine rule,

$$AB^2 = 7^2 + 9^2 - 2(7)(9) \cos 65^\circ \quad \checkmark$$

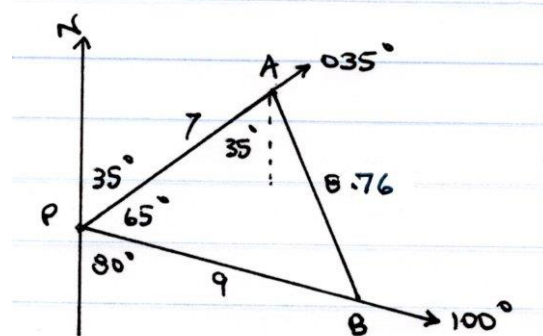
$$= 76.75009902\dots$$

$$AB = 8.760713385\dots$$

$$= 8.76 \text{ (2 dec pl)}$$

$\therefore$  the distance is 8.76 km. ✓

(c)



Using cosine rule,

$$\cos \angle PAB = \frac{7^2 + 8.76^2 - 9^2}{2(7)(8.76)}$$

$$= 0.364787997\dots$$

$$\angle PAB = 68.60546371\dots$$

$$= 69 \text{ (nearest whole)} \quad \checkmark$$

As  $69 - 35 = 34$ , and  $180 - 34 = 146$ , the bearing of  $B$  from  $A$  is  $146^\circ$ . ✓

State Mean:
<b>0.95/1</b>
<b>1.68/2</b>
<b>1.18/2</b>

**HSC Marking Feedback**

**Question 15 (a)**

Students should:

- interpret information given in written form
- solve a two-dimensional problem using graphical techniques
- use true bearings to find an angle measured in degrees.

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**In better responses, students were able to:**

- show given information on the diagram provided
- transfer true bearings onto the diagram
- use supplementary and alternate angles in the diagram.

**Areas for students to improve include:**

- showing all working
- indicating the given information on the diagram provided.

**Question 15 (b)****Students should:**

- establish the cosine rule to solve practical problems involving true bearings and compass bearings
- correctly substitute side lengths and the included angle into the cosine rule.

**In better responses, students were able to:**

- substitute the angle found into the cosine rule
- apply the cosine rule correctly
- show all working.

**Areas for students to improve include:**

- evaluating expressions correctly after substitution into the cosine rule
- using the correct mode on the calculator
- substituting correctly into the cosine rule
- showing working out in the space provided
- using the Reference Sheet to obtain correct the trigonometric formula.

**Question 15 (c)****Students should:**

- use the sine rule correctly to solve practical problems
- use trigonometric ratios to solve problems involving true bearings
- evaluate trigonometric expressions using angles and side lengths.

**In better responses, students were able to:**

- use the sine or cosine rule correctly to find an angle
- calculate the bearing using the internal angle of a triangle
- use the diagram to identify the correct quadrant of the required bearing.

**Areas for students to improve include:**

- correctly substituting corresponding angles and sides into the sine or cosine rule
- using an internal angle to determine the corresponding true bearing.

\* These solutions have been provided by [projectmaths](http://projectmaths.com.au) and are not supplied or endorsed by NESA.