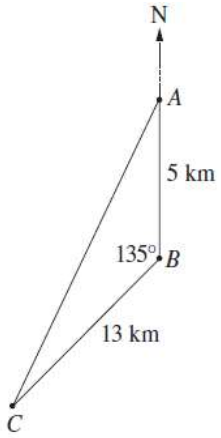
2017 30 c The diagram shows the location of three schools. School *A* is 5 km due north of school *B*, school *C* is 13 km from school *B* and $\angle ABC$ is 135°.

(i) Calculate the shortest distance from school *A* to school *C*, to the nearest kilometre. **2**

(ii) Determine the bearing of school *C* from school *A*, to the nearest degree. **3**

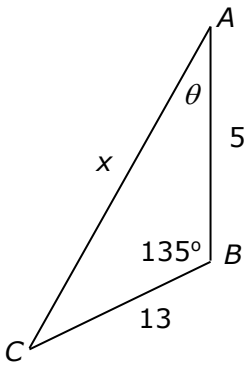


(i) Let distance = x.

Using the cosine rule:

$$x^2 = 5^2 + 13^2 - 2(5)(13)\cos 135^o$$
$$= 285.9238816\ldots$$
$$x = 16.90928389\ldots$$
$$= 17 \text{ (nearest whole)}$$

$\therefore$ the distance is 17 km.



State Mean: **1.03**

(ii) Let $\angle BAC = \theta$.

Using the sine rule:

$$\frac{\sin\theta}{13} = \frac{\sin 135^o}{17}$$

$$\sin\theta = \frac{13 \times \sin 135^o}{17}$$
$$= 0.5407 \text{ (4 dec pl)}$$
$$\theta = 32.73325942\ldots$$
$$= 33 \text{ (nearest degree)}$$

As 180 + 33 = 213, the bearing is 213°.

State Mean: **0.92**

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by NESA.

NESA: Notes from the Marking Centre

Students should:

- understand a bearing as opposed to an angle (part (c)).

Student Strengths - In better responses, students were able to:

- apply the cosine rule to find the side length of a triangle and sine rule for an angle (part (c))