

A farmer owns a triangular field ABC . The length of side $[AB]$ is 85 m and side $[AC]$ is 110 m. The angle between these two sides is 55° .

3a. Find the area of the field.

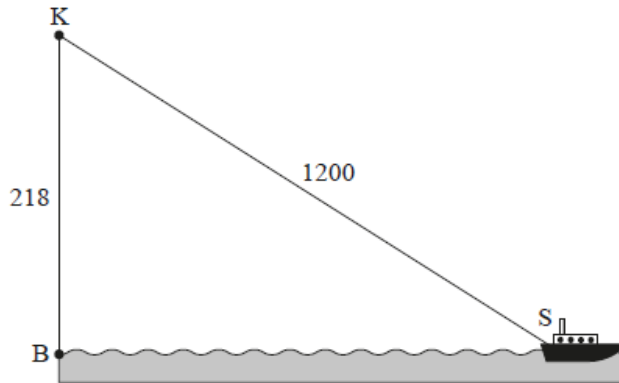
[3 marks]

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Kacheena stands at point K , the top of a 218 m vertical cliff. The base of the cliff is located at point B . A ship is located at point S , 1200 m from Kacheena.

This information is shown in the following diagram.

diagram not to scale



4a. Find the angle of elevation from the ship to Kacheena.

[2 marks]

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4b. Find the horizontal distance from the base of the cliff to the ship.

[2 marks]

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4c. Write down your answer to part (b) in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

[2 marks]

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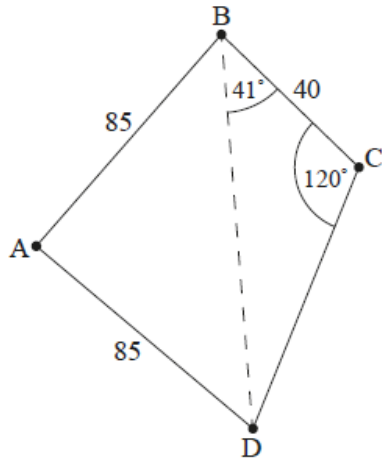
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The following diagram shows a park bounded by a fence in the shape of a quadrilateral $ABCD$. A straight path crosses through the park from B to D .

$AB = 85$ m, $AD = 85$ m, $BC = 40$ m, $\widehat{CBD} = 41^\circ$, $\widehat{BCD} = 120^\circ$

diagram not to scale



5a. Write down the value of angle BDC .

[1 mark]

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5b. Hence use triangle BDC to find the length of path BD .

[3 marks]

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5c. Calculate the size of angle \widehat{BAD} , correct to five significant figures. [3 marks]

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The size of angle \widehat{BAD} rounds to 77° , correct to the nearest degree. Use $\widehat{BAD} = 77^\circ$ for the rest of this question.

5d. Find the area bounded by the path BD , and fences AB and AD . [3 marks]

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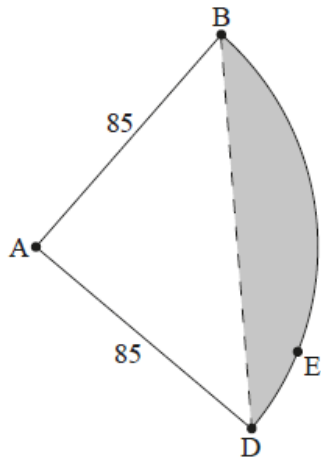
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A landscaping firm proposes a new design for the park. Fences BC and CD are to be replaced by a fence in the shape of a circular arc BED with center A. This is illustrated in the following diagram.

diagram not to scale



5e. Write down the distance from A to E.

[1 mark]

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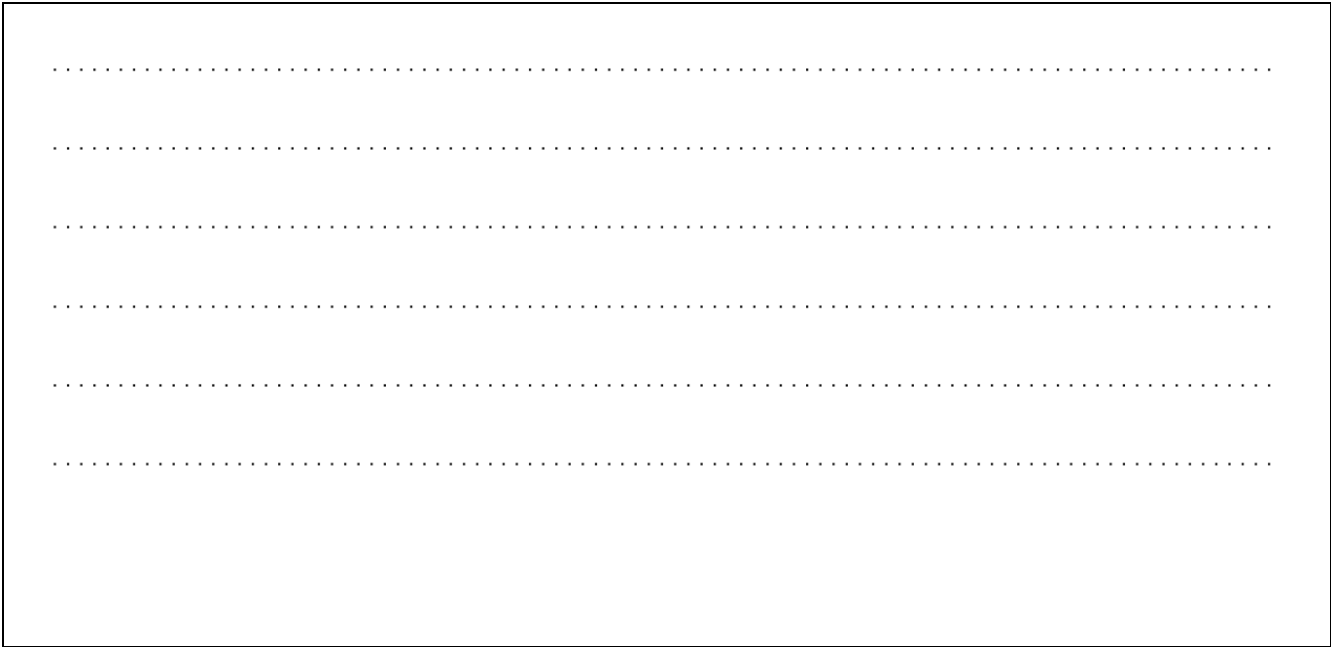
5f. Find the perimeter of the proposed park, ABED.

[3 marks]

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5g. Find the area of the shaded region in the proposed park.

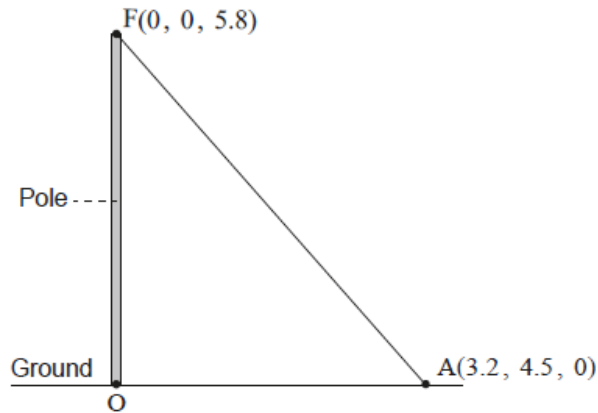
[3 marks]



A large rectangular box with a solid black border, containing six horizontal dotted lines for writing.

A vertical pole stands on horizontal ground. The bottom of the pole is taken as the origin, O , of a coordinate system in which the top, F , of the pole has coordinates $(0, 0, 5.8)$. All units are in metres.

diagram not to scale



The pole is held in place by ropes attached at F .

One of the ropes is attached to the ground at a point A with coordinates $(3.2, 4.5, 0)$. The rope forms a straight line from A to F .

6a. Find the length of the rope connecting A to F .

[2 marks]

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6b. Find $\angle FAO$, the angle the rope makes with the ground.

[2 marks]

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