(i) The course for a yacht race is a triangle, as shown in Fig. 11.1. The yachts start at A, then travel to B, then to C and finally back to A.

![Fig. 11.1](image1)

(A) Calculate the total length of the course for this race. [4]

(B) Given that the bearing of the first stage, AB, is $175^\circ$, calculate the bearing of the second stage, BC. [4]

(ii) Fig. 11.2 shows the course of another yacht race. The course follows the arc of a circle from P to Q, then a straight line back to P. The circle has radius 120 m and centre O; angle POQ = $136^\circ$.

![Fig. 11.2](image2)

Calculate the total length of the course for this race. [4]
2. Given that $140^\circ = k\pi$ radians, find the exact value of $k$. [2]

3. In Fig. 7, A and B are points on the circumference of a circle with centre O. Angle AOB = 1.2 radians. The arc length AB is 6 cm.

(i) Calculate the radius of the circle. [2]

(ii) Calculate the length of the chord AB. [3]

4. Fig. 7 shows a sector of a circle of radius 5 cm which has angle $\theta$ radians. The sector has area 30 cm$^2$.

(i) Find $\theta$. [3]

(ii) Hence find the perimeter of the sector. [2]
Fig. 10.1 shows Jean’s back garden. This is a quadrilateral ABCD with dimensions as shown.

![Diagram of garden](https://via.placeholder.com/150)

(i) (A) Calculate AC and angle ACB. Hence calculate AD. [6]

(B) Calculate the area of the garden. [3]

(ii) The shape of the fence panels used in the garden is shown in Fig. 10.2. EH is the arc of a sector of a circle with centre at the midpoint, M, of side FG, and sector angle 1.1 radians, as shown. FG = 1.8 m.

![Diagram of fence panels](https://via.placeholder.com/150)

Calculate the area of one of these fence panels. [5]
At a certain time, ship S is 5.2 km from lighthouse L on a bearing of 048°. At the same time, ship T is 6.3 km from L on a bearing of 105°, as shown in Fig. 10.1.

For these positions, calculate

(A) the distance between ships S and T,

(B) the bearing of S from T.

Ship S then travels at 24 km h⁻¹ anticlockwise along the arc of a circle, keeping 5.2 km from the lighthouse L, as shown in Fig. 10.2.

Find, in radians, the angle \( \theta \) that the line LS has turned through in 26 minutes.

Hence find, in degrees, the bearing of ship S from the lighthouse at this time.
7 Fig. 11.1 shows a village green which is bordered by 3 straight roads AB, BC and CA. The road AC runs due North and the measurements shown are in metres.

![Fig. 11.1](image)

(i) Calculate the bearing of B from C, giving your answer to the nearest 0.1°. [4]

(ii) Calculate the area of the village green. [2]

The road AB is replaced by a new road, as shown in Fig. 11.2. The village green is extended up to the new road.

![Fig. 11.2](image)

(iii) (A) Show that angle AOB is 1.63 radians, correct to 3 significant figures. [2]

(B) Show that the area of land added to the village green is 5300 m² correct to 2 significant figures. [4]