*Full marks are not necessarily awarded for a correct answer with no working. Answers must be supported by working and/or explanations. In particular, solutions found from a graphic display calculator should be supported by suitable working, for example if graphs are used to find a solution, you should sketch these as part of your answer. Where an answer is incorrect, some marks may be given for a correct method, provided this is shown by written working. You are therefore advised to show all working.*

SECTION A

*Answer **all** questions in the boxes provided. Working may be continued below the lines if necessary.*

1. *[Maximum mark: 6]*

The following diagram shows a circle with centre O and radius 5 cm.

diagram not to scale

The points A, B and C lie on the circumference of the circle, and $A\hat{O}C = 0.7$ radians .
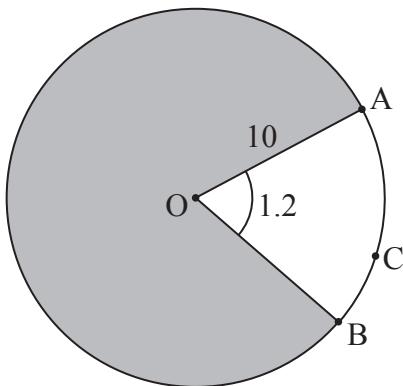
(a) (i) Find the length of the arc ABC.

(ii) Find the perimeter of the shaded sector. *[4]*

(b) Find the area of the shaded sector. *[2]*

(This question continues on the following page)

2. [Maximum mark: 5]

The following diagram shows a circle with centre O and a radius of $10\,cm$. Points A, B and C lie on the circle.

Angle AOB is 1.2 radians.

(a) Find the length of arc ACB. [2]

(b) Find the perimeter of the shaded region. [3]
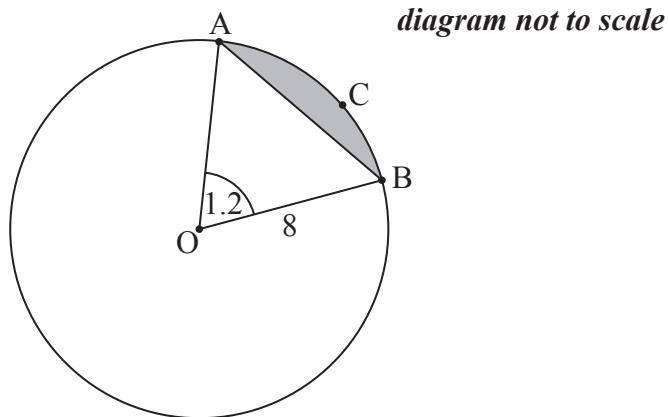
3.   *[Maximum mark: 7]*

The following diagram shows a circle with centre O and radius 8 cm.

diagram not to scale

The points A, B and C are on the circumference of the circle, and $A\hat{O}B = 1.2$ radians.

(a)   Find the length of arc ACB.   *[2]*

(b)   Find AB.   *[3]*

(c)   Hence, find the perimeter of the shaded segment ABC.   *[2]*

5. *[Maximum mark: 7]*

In triangle ABC, $AB = 6\,cm$ and $AC = 8\,cm$. The area of the triangle is $16\,cm^2$.

(a) Find the two possible values for $\hat{A}$. *[4]*

(b) Given that $\hat{A}$ is obtuse, find BC. *[3]*

Turn over

5. [Maximum mark: 7]

Given that $\sin x = \dfrac{3}{4}$, where x is an obtuse angle, find the value of

(a) $\cos x$; [4]

(b) $\cos 2x$. [3]

10. *[Maximum mark: 15]*

The sides of a square are 16 cm in length. The midpoints of the sides of this square are joined to form a new square and four triangles (diagram 1). The process is repeated twice, as shown in diagrams 2 and 3.
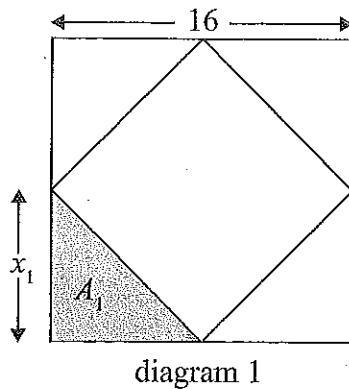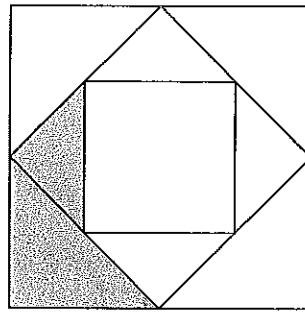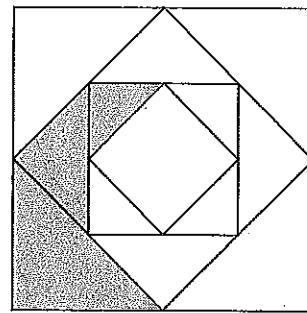
diagram 1   diagram 2   diagram 3

Let x_n denote the length of one of the equal sides of each new triangle.
Let A_n denote the area of each new triangle.

(a) The following table gives the values of x_n and A_n, for $1 \leq n \leq 3$. **Copy** and complete the table. *(Do **not** write on this page.)* [4]

n	1	2	3
x_n	8		4
A_n	32	16	

(b) The process described above is repeated. Find A_6. [4]

(c) Consider an initial square of side length k cm. The process described above is repeated indefinitely. The total area of the shaded regions is k cm^2. Find the value of k. [7]