MATHEMATICS   Series B

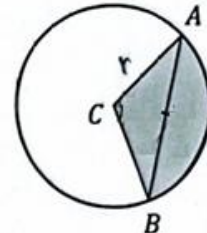**The answers must be justified.**

Problem 1   2.0 points

Consider a circle with center C and radius 8 cm.

The area of the gray sector is equal to 15% of the area of the whole disc.

The drawing is not to scale.

Calculate the length of the segment AB.
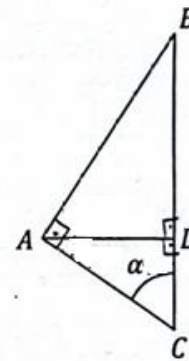
Problem 2   1.5 points

The triangle ABC is a right triangle with right angle at vertex A.

The segment AD is perpendicular to the segment BC.

The length of AD is 20 cm and $\alpha = 50°$.

The drawing is not to scale.

Calculate the area of triangle ABC.

Problem 3   4.0 points

a)   Calculate all the values of x, $-\pi \leq x \leq \pi$ radians, such that $15\cos(x) - 4\sin(x) = 0$.

.b)   Calculate all the values of x, $0 \leq x \leq 2\pi$ radians, such that $10\cos^2(x) + 2\sin(x) = 2$.

Problem 4   2.5 points

A part of the graph of $y = 4\cos(\omega x)$ is given. The point $M(5; -4)$ is a minimum.

Calculate the exact x-coordinates of $P(...; 0)$ and $R(...; 2)$.

Give the answers as fractions.