



The diagram shows a sector AOB of a circle with centre O and radius 6 cm.
 The angle AOB is θ radians.
 The area of the segment bounded by the chord AB and the arc AB is 7.2 cm².

(a) Show that $\theta = 0.4 + \sin \theta$. [3]

(b) Let $F(\theta) = 0.4 + \sin \theta$.

By considering the value of $F'(\theta)$ where $\theta = 1.2$, explain why using an iterative method based on the equation in part (a) will converge to the root, assuming that 1.2 is sufficiently close to the root. [2]

(c) Use the iterative formula $\theta_{n+1} = 0.4 + \sin \theta_n$ with a starting value of 1.2 to find the value of θ correct to 4 significant figures.

You should show the result of each iteration. [3]

(d) Use a change of sign method to show that the value of θ found in part (c) is correct to 4 significant figures. [3]