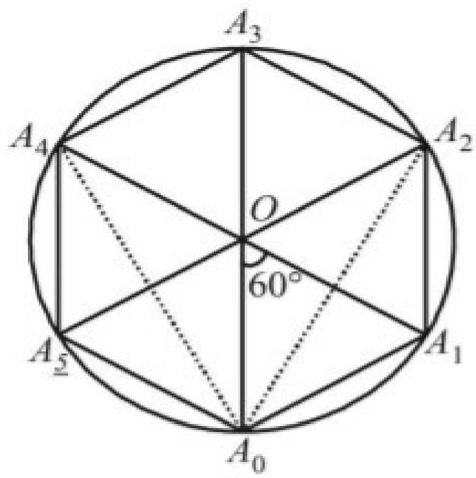
4. Let $A_0A_1A_2A_3A_4A_5$ be a regular hexagon inscribed in a circle of unit radius. Then the product of the lengths of the line segments A_0A_1, A_0A_2 and A_0A_4 is *(1998 - 2 Marks)*

(a) $\frac{3}{4}$ (b) $3\sqrt{3}$ (c) 3 (d) $\frac{3\sqrt{3}}{2}$

Solution: -

4. **(c)** Given that $A_0A_1A_2A_3A_4A_5$ is a regular hexagon inscribed in a circle of radius 1.



$$\angle A_0OA_1 = \frac{360°}{6} = 60°$$

But in ΔOA_0A_1, $OA_0 = OA_1 = 1$

$\therefore \quad \angle OA_0A_1 = \angle OA_1A_0 = 60°$

$\therefore \quad \Delta OA_0A_1$ is an equilateral Δ

$\therefore \quad A_0A_1 = 1 = A_1A_2 = A_2A_3 = A_3A_4 = A_4A_5 = A_5A_0$

$\angle A_0A_1A_2 = 60° + 60° = 120°$

In $\Delta A_0A_1A_2$, using cosine law we get

$$\cos 120° = \frac{(A_0A_1)^2 + (A_1A_2)^2 - (A_0A_2)^2}{2(A_0A_1)(A_1A_2)}$$

$$\Rightarrow \quad -\frac{1}{2} = \frac{1+1-(A_0A_2)^2}{2\times1\times1} \Rightarrow A_0A_2 = \sqrt{3}$$