

Question. The sides of a triangle are $\sin \alpha$, $\cos \alpha$ and $\sqrt{1 + \sin \alpha \cos \alpha}$ for some $0 < \alpha < \frac{\pi}{2}$. Then the greatest angle of the triangle is: \rightarrow

(a) 60°

(b) 90°

(c) 120°

(d) 150°

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Solution

Let $a = \sin \alpha$, $b = \cos \alpha$, $c = \sqrt{1 + \sin \alpha \cos \alpha}$

\therefore By cosine rule,

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

$$= \frac{\sin^2 \alpha + \cos^2 \alpha - (1 + \sin \alpha \cos \alpha)}{2 \times \sin \alpha \times \cos \alpha}$$

$$= -\frac{1}{2}$$

 \Rightarrow

$$\boxed{C = 120^\circ}$$

\therefore A triangle cannot have more than one obtuse angle

\therefore Largest angle = 120° Ans Option (c).