

$$\tan^2 = \frac{\sin^2 u}{\cos^2 u}, \sin^2 u = 1 - \cos^2 u \Rightarrow 1 - \cos^2 u - \frac{1 - \cos^2 u}{\cos^2 u} = 1$$

$$\times \cos^2 u \rightarrow 1 - \cos^2 u - 1 + \cos^2 u = \cos^2 u \Rightarrow 1 - \cos^2 u - 1 = 0 \Rightarrow \cos^2 u = \frac{1}{2}$$

$$\cos u = \frac{1}{\sqrt{2}} \Rightarrow u = \frac{\pi}{4}, \frac{7\pi}{4}$$

$$* \tan u: \frac{\sin u}{\cos u} \Rightarrow \cos u \neq 0 \Rightarrow u \neq \frac{3\pi}{2}, \frac{\pi}{2} \quad \text{✓}$$

$$\Delta \sin^2(u) + 2 \cos(2u) = 2 \Rightarrow \Delta \sin^2(u) = -2 - 2 \cos(2u) \Rightarrow \Delta \sin^2(u) = -2(1 + \cos(2u))$$

$$\Rightarrow -1 \leq \cos(2u) \leq 1 \Rightarrow 0 \leq \cos(2u) \leq 2 \quad \leftarrow \text{همواره + یا صفر}$$

$$\Rightarrow \Delta \sin^2(u) = 0 \Rightarrow \sin = 0 \Rightarrow \pi, -\pi$$

$$\Rightarrow -2 - 2 \cos(2u) = 0 \Rightarrow \cos(2u) = -1 \Rightarrow \pi, -\pi \Rightarrow \boxed{\pi, -\pi \text{ جواب دارد}} \quad \text{✓}$$

$$\cos(2u) = 1 - 2 \sin^2 u \Rightarrow 2 \sin^2 u \cos(2u) + \sin(u) = 1$$

$$\Rightarrow 2 \sin^2 u \times 2 \sin^2 u + \sin u = 1 \Rightarrow 4 \sin^4 u + \sin u = 1$$

$$4 \sin^4 u - 3 \sin^2 u + 1 = 0 \Rightarrow \sin(2u) = 1 \Rightarrow 2u = \frac{\pi}{2} + \frac{\pi}{2}$$

$$\sin(2u) \Rightarrow u = \frac{\pi}{4} + \frac{\pi}{4} \Rightarrow \boxed{\frac{\pi}{4} + \frac{\Delta \pi}{4} + \frac{\pi}{4} = \frac{1 \Delta \pi}{4} = \frac{\Delta \pi}{4}}$$

$$\frac{C.S 2u - \sin 2u}{-C.S 2u \sin 2u} = 0 \quad \frac{C.S 2u \neq 0}{\sin 2u \neq 0} \quad C.S 2u - \sin 2u = 0$$

$$C.S 2u (1 - \sin 2u) = 0$$

$$\sin 2u = \frac{1}{2} \rightarrow u = \frac{\Delta \pi}{12} \rightarrow \frac{\Delta \pi}{12} - \frac{\pi}{12} = \frac{\pi}{12}$$

$$\alpha = \frac{\pi}{12} \rightarrow \tan 2\alpha = -\sqrt{3}$$

$$C.S(u + \frac{\pi}{6}) = \frac{\sqrt{2}}{2} (C.S u - \sin u) = \frac{\sqrt{3}}{2}$$

$$C.S u - \sin u = \frac{\sqrt{4}}{2} \quad \text{توان} \rightarrow \sin 2u = \frac{1}{2}$$

$$m \times \frac{\sqrt{4}}{2} = 2 \sqrt{4} \times \frac{1}{2} = \sqrt{4} \rightarrow m = 4$$

$$\sin\left(u + \frac{\pi}{4}\right) \cos\left(u - \frac{\pi}{4}\right) = 1 \Rightarrow \sin a \cos b = \frac{1}{4} [\sin(a+b) + \sin(a-b)]$$

$$\Rightarrow u + \frac{\pi}{4} + u - \frac{\pi}{4} = 2u - \frac{\pi}{4}$$

$$\Rightarrow u + \frac{\pi}{4} - u + \frac{\pi}{4} = \frac{\pi}{2}$$

$$2u - \frac{\pi}{4} = 2k\pi + \frac{\pi}{4}$$

$$\Rightarrow u = k\pi + \frac{\pi}{2} \Rightarrow \frac{\pi}{2}, \frac{3\pi}{2}$$

$$\Rightarrow \frac{1}{4} [\sin(2u - \frac{\pi}{4}) + 1] = 1 \Rightarrow \sin(2k\pi - \frac{\pi}{4}) = 1$$

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$$\sin\left(\eta + \frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\eta + \frac{\pi}{4} = 2k\pi + \frac{\pi}{4} \rightarrow \eta = 2k\pi - \frac{\pi}{4} \rightarrow -\frac{\pi}{4}, \frac{7\pi}{4}$$

$$\eta + \frac{\pi}{4} = 2k\pi + \frac{5\pi}{4} \rightarrow \eta = 2k\pi + \frac{4\pi}{4} \rightarrow \frac{4\pi}{4}$$

مربع - $\frac{9\pi}{4}$

$$\sqrt{2} \sin u \sin\left(\frac{\sqrt{2}}{2} - u\right) = 1 \Rightarrow -\sqrt{2} \sin u \cos u = 1$$

- cos u

$$(\sin 2u = \sqrt{2} \sin u \cos u)$$

$$2) k\pi + \frac{\sqrt{2}}{2}$$

$$3) k\pi + \frac{11\pi}{12}$$

$$\frac{\sqrt{2}}{12} + \frac{11\pi}{12} + \frac{19\pi}{12} + \frac{23\pi}{12} = 4\pi$$

$$-\sqrt{2} \sin 2u = 1$$

$$\sin 2u = -\frac{1}{\sqrt{2}}$$

$$2u = \frac{7\pi}{4} + 2k\pi$$

$$1 + \cos 2\alpha = 2 \cos^2 \alpha$$

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$$\rightarrow \cos 2\alpha \cos 2\alpha \cos 2\alpha = \pm \frac{1}{\sqrt{2}}$$

$$\times \sin \alpha$$

$$\sin 2\alpha = \pm \sin \alpha$$

$$2\alpha = 2k\pi + \alpha$$

$$2\alpha = 2k\pi + \pi - \alpha$$

$$2\alpha = 2k\pi - \alpha$$

$$2\alpha = 2k\pi + \pi + \alpha$$

$$\left\{ \begin{array}{l} \alpha = \frac{2k\pi}{3} \\ \alpha = \frac{2k\pi}{3} \end{array} \right. \quad \left\{ \begin{array}{l} \alpha = \frac{2k\pi + \pi}{3} \\ \alpha = \frac{2k\pi + \pi}{3} \end{array} \right.$$

$$\tan(2u) \tan(u) = 1 \Rightarrow \frac{\sin(2u)}{\cos(2u)} \times \frac{\sin u}{\cos u} = 1 \Rightarrow \cos(2u) \neq 0$$

$$\Rightarrow \sin(2u) \sin u = \cos(2u) \cos u \Rightarrow \cos(2u) \cos u - \sin(2u) \sin u = 0$$

$$(\cos(a+b) = \cos a \cos b - \sin a \sin b) \Rightarrow \cos(2u+u) = 0 \Rightarrow \cos(3u) = 0$$

$$3u = k\pi + \frac{\pi}{2} \Rightarrow u = \frac{k\pi}{3} + \frac{\pi}{6} \Rightarrow u = \frac{\pi}{6} + \frac{\pi}{6} = \frac{\pi}{3}$$

$$u = \frac{5\pi}{6} + \frac{\pi}{6} = \frac{2\pi}{3} \quad u = \frac{7\pi}{6} + \frac{\pi}{6} = \frac{4\pi}{3} \quad u = \frac{9\pi}{6} + \frac{\pi}{6} = \frac{5\pi}{2}$$