

$$\Lambda \cos u = 1 + \tan^2 u \quad \Lambda \cos u = \frac{1}{\cos^2 u} \quad \Lambda \cos^3 u = 1 \quad \cos u = \frac{1}{\sqrt{}} \quad 0 \leq u \leq \pi \rightarrow \text{دو جواب} \quad (1)$$

$$\text{if } \sin(u) = 0 \rightarrow \cos(\sqrt{u}) = -1 \rightarrow \Lambda \sin^2(u) + \sqrt{u} \cos(\sqrt{u}) = -\sqrt{u} \quad \sin u = 0 \rightarrow u = k\pi \quad (I) \\ \cos(\sqrt{u}) = -1 \rightarrow \sqrt{u} = 2k\pi + \pi \quad (II) \quad I \cap II \quad \frac{-\pi \leq u \leq \pi}{\rightarrow} u = \{-\pi, \pi\} \quad \text{دو جواب} \quad (2)$$

$$\sqrt{u} \sin u (1 - \sqrt{u} \sin^2 u) + \sin u = 1 \quad \sqrt{u} \sin u - \sqrt{u} \sin^3 u + \sin u = 1 \quad \sqrt{u} \sin u - \sqrt{u} \sin^3 u = 1 \\ \sin \sqrt{u} = 1 \quad \sqrt{u} = 2k\pi + \frac{\pi}{2} \quad u = \frac{4k^2\pi^2}{4} + \frac{\pi^2}{4} \quad u = \left\{ \frac{\pi^2}{4}, \frac{9\pi^2}{4}, \frac{16\pi^2}{4} \right\} \quad \text{ج.} = \frac{16\pi^2}{4} = \frac{4\pi^2}{1} \quad (3)$$

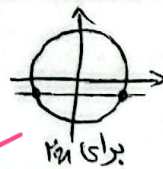
$$\frac{1}{\sin(\frac{\pi}{\sqrt{u}} + \sqrt{u})} + \frac{1}{\cos(\frac{\pi}{\sqrt{u}} + \sqrt{u})} \quad \frac{1}{\cos \sqrt{u}} - \frac{1}{\sin \sqrt{u}} = \frac{1}{\cos \sqrt{u}} - \frac{1}{\sqrt{u} \cos \sqrt{u} \sin \sqrt{u}} = \frac{\sqrt{u} \sin \sqrt{u} - 1}{\cos \sqrt{u} \sin \sqrt{u}} = 0 \quad (4) \\ \sin \sqrt{u} = \frac{1}{\sqrt{u}} \quad \sqrt{u} = 2k\pi + \frac{\pi}{2} \quad u = k\pi + \frac{\pi^2}{4} \quad \sqrt{u} = 2k\pi + \pi - \frac{\pi}{2} \quad u = k\pi + \frac{9\pi^2}{4} \\ 0 \leq u \leq \pi \rightarrow u = \left\{ \frac{\pi^2}{4}, \frac{9\pi^2}{4} \right\} \quad \alpha = \frac{5\pi}{12} = \frac{\pi}{\sqrt{u}} \quad \tan \frac{\pi}{\sqrt{u}} = -\sqrt{u} \quad (5)$$

$$\cos(u + \frac{\pi}{\sqrt{u}}) = \cos(u - \frac{\pi}{\sqrt{u}} + \frac{\pi}{\sqrt{u}}) = -\sin(u - \frac{\pi}{\sqrt{u}}) = \frac{\sqrt{u}}{\sqrt{u}} (\cos u - \sin u) = \frac{\sqrt{u}}{\sqrt{u}} \rightarrow \cos u - \sin u = \frac{\sqrt{u}}{\sqrt{u}} \quad (6) \\ \sin \sqrt{u} = 1 - (\cos u - \sin u)^2 = 1 - \frac{u}{u} = \frac{1}{\sqrt{u}} \quad \frac{\sqrt{u}}{\sqrt{u}} m - \sqrt{u} (\frac{1}{\sqrt{u}}) = \sqrt{u} \quad \frac{\sqrt{u}}{\sqrt{u}} m = \sqrt{u} \quad m = \sqrt{u}$$

$$\sin(u - \frac{\pi}{\sqrt{u}} + \frac{\pi}{\sqrt{u}}) \cos(u - \frac{\pi}{\sqrt{u}}) = 1 \quad \cos^2(u - \frac{\pi}{\sqrt{u}}) = 1 \quad \cos(u - \frac{\pi}{\sqrt{u}}) = \pm 1 \quad u - \frac{\pi}{\sqrt{u}} = k\pi \quad (7) \\ u = k\pi + \frac{\pi}{\sqrt{u}} \quad 0 \leq u \leq \pi \rightarrow u = \left\{ \frac{\pi^2}{4}, \frac{9\pi^2}{4} \right\} \quad \text{دو جواب}$$

$$\sin u + \frac{\sin \frac{\pi}{\sqrt{u}}}{\cos \frac{\pi}{\sqrt{u}}} \cos u = \sqrt{u} \quad \frac{\sin u \cos \frac{\pi}{\sqrt{u}} + \sin \frac{\pi}{\sqrt{u}} \cos u}{\cos \frac{\pi}{\sqrt{u}}} = \sqrt{u} \quad \frac{\sin(u + \frac{\pi}{\sqrt{u}})}{\frac{1}{\sqrt{u}}} = \sqrt{u} \quad (1, 175) \quad (8) \\ \sin(u + \frac{\pi}{\sqrt{u}}) = \frac{\sqrt{u}}{\sqrt{u}} \quad u + \frac{\pi}{\sqrt{u}} = 2k\pi + \frac{\pi}{2} \quad u = 2k\pi - \frac{\pi}{\sqrt{u}} \quad u + \frac{\pi}{\sqrt{u}} = 2k\pi + \pi - \frac{\pi}{\sqrt{u}} \quad u = 2k\pi + \frac{9\pi^2}{4} \\ -\pi \leq u \leq \pi \rightarrow u = \left\{ -\frac{\pi^2}{4}, \frac{9\pi^2}{4}, \frac{16\pi^2}{4} \right\} \quad \text{ج.} = \frac{16\pi^2}{4}$$

$$\sqrt{u} \sin u (-\cos u) = 1 \quad -\sqrt{u} \sin \sqrt{u} = 1 \quad \sin \sqrt{u} = -\frac{1}{\sqrt{u}} \quad \text{دو جواب} \quad (9) \\ \text{ج.} = \frac{9\pi^2}{4} + \frac{16\pi^2}{4} + \pi + \frac{9\pi^2}{4} + \pi + \frac{16\pi^2}{4} = 10\pi$$



$$(\sqrt{u} \cos^2 \alpha)(\sqrt{u} \cos^2 \beta)(\sqrt{u} \cos^2 \gamma) = \frac{1}{\Lambda} \rightarrow |(\cos \alpha)(\cos \beta)(\cos \gamma)| = \frac{1}{\Lambda} \quad \frac{|\sin \alpha|}{|\sin \alpha|} \quad (10) \\ \frac{|\frac{1}{\sqrt{u}} \sin \beta| (\cos^2 \beta)(\cos^2 \gamma)}{|\sin \alpha|} = \frac{1}{\Lambda} \quad \frac{\frac{1}{\Lambda} |\sin \Lambda \alpha|}{|\sin \alpha|} = \frac{1}{\Lambda} \quad |\sin \Lambda \alpha| = |\sin \alpha|$$

$$\sin \Lambda \alpha = \sin \alpha \rightarrow \Lambda \alpha = 2k\pi + \alpha \quad \alpha = \frac{2k\pi}{\Lambda} \quad \Lambda \alpha = 2k\pi + \pi - \alpha \quad \alpha = \frac{2k\pi}{\Lambda} + \frac{\pi}{\Lambda} \\ \sin \Lambda \alpha = -\sin \alpha = \sin(\pi + \alpha) \quad \Lambda \alpha = 2k\pi + \pi + \alpha \quad \alpha = \frac{2k\pi}{\Lambda} + \frac{\pi}{\Lambda} \quad \Lambda \alpha = 2k\pi + \pi - \pi - \alpha \\ \alpha = \frac{2k\pi}{\Lambda} \quad \alpha_{\max} = \frac{\Lambda \pi}{\Lambda} \quad (11)$$

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$$\tan(13\theta) = \frac{1}{\tan\theta} = \cot\theta = \tan\left(\frac{\pi}{2} - \theta\right) \quad 13\theta = k\pi + \frac{\pi}{2} - \theta \quad 14\theta = k\pi + \frac{\pi}{2} \quad (10)$$

$$\theta = \frac{k\pi}{14} + \frac{\pi}{28}$$

$$\text{مجموع} = \pi + \frac{\pi}{14} + \frac{11\pi}{14} + \frac{13\pi}{14} + \frac{15\pi}{14} = 6\pi$$

⑦ عبارت را $\frac{1}{r}$ ضرب می‌کنیم.

$$\frac{1}{r} \sin u + \frac{\sqrt{r}}{r} \cos u = \frac{\sqrt{r}}{r}$$

$$\cos 45^\circ \sin u + \sin 45^\circ \cos u = \frac{\sqrt{r}}{r} \rightarrow \sin\left(u + \frac{\pi}{4}\right) = \frac{\sqrt{r}}{r}$$

$$\left| u + \frac{\pi}{4} = 2k\pi + \frac{\pi}{2} \rightarrow u = 2k\pi - \frac{\pi}{4} \xrightarrow{-\pi \leq u \leq \pi} k < 0, 1 \rightarrow u = -\frac{\pi}{4}, \frac{7\pi}{4}$$

$$\left| u + \frac{\pi}{4} = 2k\pi + \frac{3\pi}{2} \rightarrow u = 2k\pi + \frac{5\pi}{4} \xrightarrow{-\pi \leq u \leq \pi} k < 0 \rightarrow u = \frac{5\pi}{4}$$

$$S = \frac{7\pi}{4} - \frac{\pi}{4} + \frac{5\pi}{4} = \frac{11\pi}{4} = \boxed{\frac{9\pi}{4}}$$