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ایلیا رضوانی راد ۱۱۶ پسر B

۱- (۲)

$\cot = \frac{\cos}{\sqrt{1-\cos^2}} \Rightarrow \sin > 0$

$\frac{1}{|\cos|} - \frac{\sin}{\cos} = \frac{1-\sin}{|\cos|} \Rightarrow \frac{\sin}{\cos} = \frac{\sin}{|\cos|} \Rightarrow \cos > 0$ ✓

۲- (۲)

$\frac{-\pi}{6} < 2\alpha < \frac{5\pi}{6}$ $\quad \frac{-1}{2} < \frac{M-1}{4} \le 1$ $\quad -1 < M \le 5$ ✓

۳- (۱)

$\tan + \cot = -3 \Rightarrow \frac{-1}{3} = \sin\cdot\cos$ ✓ $\quad \frac{3\pi}{4} < \alpha < \pi \Rightarrow \sin > 0, \cos < 0$

$(\sin+\cos)^2 = 1 + 2(\frac{-1}{3}) = \frac{1}{3} \Rightarrow \frac{1}{(\sin+\cos)(1+(\frac{-1}{3}))} = \frac{1}{\frac{\sqrt3}{3}\times\frac{2}{3}} = \frac{3\sqrt3}{2}$

۴- ۵

$\cos\theta = 0.6 \Rightarrow 5\times 0.6 = 3 = h$ $\quad 3\times\frac{5+2}{2} = 10.5$

۵- (۲)

$-\tan(\frac{3\pi}{2}+15)\tan(\pi-15) - \sin(15)\cos(\frac{3\pi}{2}-15)$

$+\cot 15 \times -\tan 15 + \sin 15 \times \sin 15 = \sin^2 15 - 1 = -\cos^2 15 \Rightarrow K = -1$ ✓

۶- (۲)

$\sqrt3 \times \frac{1+\sqrt3}{2} \times \cos 27 + \sqrt2 \times \frac{\sqrt2}{2} \times \cos 27 = (2.5)\cos 27$ ✓

۷- (۲)

$16 \times \cos^2(\frac{\pi}{12})\cos^2(\frac{\pi}{4})\cos^2(\frac{\pi}{3})\cos^2(\frac{2\pi}{3}) = \frac{6+3\sqrt3}{16}$ ✓

$\frac{1+\cos\frac{\pi}{6}}{2} = \cos^2\frac{\pi}{12} = \frac{2+\sqrt3}{4}$

۸- (۲)

$1 - \sin = 4 + 4\sin \Rightarrow \sin = \frac{-3}{5}$ $\quad \cos = \frac{-4}{5}$ $\quad \tan = \frac{3}{4}$

$\frac{3}{4} = \frac{2(\tan\frac{\alpha}{2})}{1-\tan^2\frac{\alpha}{2}} \Rightarrow \frac{3}{4} - \frac{3}{4}t^2 = 2t \Rightarrow 3t^2 + 8t - 3 = 0 \Rightarrow \frac{-8-\sqrt{64+36}}{6} = -3$ ✓

$t < 0$

۹- (۲)

$\frac{1+\cos}{\sin} = \frac{\sin}{1-\cos} \Rightarrow \frac{2(1+\cos)}{\sin} = 2\cot\frac{x}{2} \Rightarrow K = 2$ ✓

۱۰- (۲)

$\cos(\frac{3\pi}{4}+\alpha) = \cos\alpha \times \frac{-\sqrt2}{2} - \sin\alpha \times \frac{\sqrt2}{2} = \frac{\sqrt2}{2}\left(\frac{\sqrt{98}-\sqrt2}{10}\right) = 0.6$ ✓

$\cos\alpha \to \frac{-\sqrt{98}}{10}$ $\quad \sin\alpha \to \frac{\sqrt2}{10}$

-۳

$$(\sin\alpha+\cos\alpha)^2 = 1+2\sin\alpha\cos\alpha$$
$$= 1+2\left(-\frac{1}{3}\right) = \frac{1}{3}$$

$$3\pi < 4x < 4\pi \rightarrow \frac{3}{4}\pi < x < \pi \xrightarrow{\sin x+\cos x<0} \frac{-\sqrt{3}}{3}$$

$$\sin^3 x+\cos^3 x = (\sin x+\cos x)(\sin^2 x+\cos^2 x-\sin x\cos x) = -\frac{\sqrt{3}}{3}\left(\frac{4}{3}\right)$$

$$\hookrightarrow 1-\left(-\frac{1}{3}\right) = \frac{4}{3}$$

$$\rightarrow \frac{1}{\sin^3 x+\cos^3 x} = \boxed{\frac{-3}{4}\sqrt{3}}$$

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$$\cos\theta = \frac{6}{10} = \frac{x}{5} \rightarrow x = 3$$

$$\sin\theta = \frac{8}{10} = \frac{h}{5} \rightarrow h = 4$$

$$\rightarrow S = \frac{(2+8)}{2}\times 4 = \boxed{20}$$