زهرا کاردانی ۱۹٫۷۵

۱-

$\cot a = \frac{\cos a}{\sqrt{1-\cos^2 a}}$, $\underbrace{\frac{1}{\sqrt{\cos^2 a}} - \frac{1}{\cot a}}$ $= \frac{1-\sin a}{|\cos a|}$

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

$\sin a > 0$, $\cos a > 0$ } انتهای a = $\boxed{\text{ربع ۱}}$ ۲

۲-

$\sin 2x = \frac{m-1}{4}$, $\frac{-\pi}{12} < x < \frac{5\pi}{12} \to \frac{-\pi}{6} < 2x < \frac{5\pi}{6} \to -\frac{1}{2} < \sin 2x \le 1$

$\frac{-1}{2} < \frac{m-1}{4} \le 1 \to -2 < m-1 \le 4 \to -1 < m \le 5 \to (-1, 5]$ ۱

۳-

$\tan x + \cot x = -3$, $3\pi < 4x < 4\pi$, $\frac{1}{\sin^3 x + \cos^3 x} =$

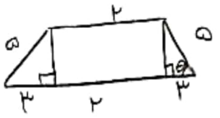
$\tan x + \cot x = -3 \to \frac{2}{\sin 2x} = -3 \to \frac{-1}{3} = \sin x \cos x \to 3\pi < 4x < 4\pi$

$\frac{3\pi}{4} < x < \pi$

$\frac{1}{\sin^3 x + \cos^3 x} = \frac{1}{\underbrace{(\sin x + \cos x)}_{\frac{1}{\sqrt{3}}}\underbrace{(1 - \sin x \cos x)}_{\frac{4}{3}}} = \frac{1}{\frac{4}{3\sqrt{3}}} = \boxed{\frac{3\sqrt{3}}{4}}$ ۱٫۷۵

۴-

قاعده کوچک $= 2$ ساق $= 5$ $\cos\theta = 0.6$ θ زاویه حاده بین ساق و قاعده



$S_{\text{ذوزنقه}} = \frac{(2+8)4}{2} = \boxed{20}$ ۲

۵-

$\underbrace{\underbrace{\tan(285^\circ)}_{-\cot 15}\ \underbrace{\tan(-165^\circ)}_{\tan 15} - \underbrace{\sin(195^\circ)}_{\sin 15}\ \underbrace{\cos(255^\circ)}_{-\sin 15}} = k\cos^2 15$ ۲

$(-\cot 15 \tan 15) - \sin 15 \sin 15 \to -1 + \sin^2 15 = -\cos^2 15 = k\cos^2 15 \to \boxed{k=-1}$

۶-

$\underbrace{\sqrt{3}\cos(210^\circ)}_{-\frac{3}{2}}\ \underbrace{\sin(243^\circ)}_{(\frac{3\pi}{2}-27)\ \to\ -\cos 27} - \underbrace{\sqrt{2}\sin(135^\circ)}_{+\frac{\sqrt{2}}{2}\ \to\ -1}\ \underbrace{\cos(153^\circ)}_{(\pi-27)\ \to\ -\cos 27} = \frac{3}{2}\cos 27 + \cos 27 = \frac{5}{2}\cos 27$ ۲

$\boxed{\text{برابر } \frac{5}{2}}$

۷-

$f(\frac{\pi}{36}) = 16\cos^2(\frac{3\pi}{36})\cos^2(\frac{9\pi}{36})\cos^2(\frac{12\pi}{36})\cos^2(\frac{24\pi}{36})$

$16\cos^2(\frac{\pi}{12})\cos^2(\frac{\pi}{4})\cos^2(\frac{\pi}{3})\cos^2(\frac{2\pi}{3}) = (\cancel{16}\,4\,\frac{2+\sqrt{3}}{4})(\frac{3}{4})(\frac{1}{4})(\frac{1}{4}) = \boxed{\frac{3+(2+\sqrt{3})}{16}}$ ۲

۸-

$\frac{1-\sin x}{1+\sin x} = \left(\frac{\sin\frac{x}{2} - \cos\frac{x}{2}}{\sin\frac{x}{2} + \cos\frac{x}{2}}\right)^{\cancel{2}} = \cancel{4}\ 2 \to -3\cos\frac{x}{2} = \sin\frac{x}{2} \to \tan\frac{x}{2} = \boxed{-3}$ ۲

۹-

$\frac{\sin\theta}{1-\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = \frac{\sin^2\theta + 1 - \cos^2\theta}{\sin\theta(1-\cos\theta)} = \frac{2\sin\theta(1+\cos\theta)}{\underbrace{1-\cos^2\theta}_{\sin^2\theta}} = \frac{2(1+\cos\theta)}{\sin\theta}$ ($2\cot\frac{\theta}{2}$) $\Rightarrow 2\cot\frac{\theta}{2} = k\cot\frac{\theta}{2}$ ۲

$\to \boxed{k=2}$

۱۰-

$\alpha \to$ ربع ۲ $\sin a = \frac{\sqrt{2}}{10} \to \cos a = \frac{-7}{5\sqrt{2}}$

$\cos(\frac{11\pi}{4} + a) = -\frac{\sqrt{2}}{2}\cos a - \frac{\sqrt{2}}{2}\sin a = -\frac{\sqrt{2}}{2}(\cos a + \sin a) = -\frac{\sqrt{2}}{2}(\frac{-7}{5\sqrt{2}} + \frac{1}{5\sqrt{2}}) = \boxed{\frac{6}{10}}$ ۲