آیناز شاه آبادی

۱)

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

α [illegible]

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

$\rightarrow 1-\cos^2\alpha = \sin^2\alpha$

$\frac{1}{|\cos\alpha|} - \frac{\sin}{\cos} = \frac{1-\sin\alpha}{|\cos\alpha|}$ علامت تغییر میکند $\Rightarrow \cos > 0$

$\Rightarrow \cot\alpha = \frac{\cos\alpha}{|\sin\alpha|} \Rightarrow \sin\alpha > 0$

ناحیه اول

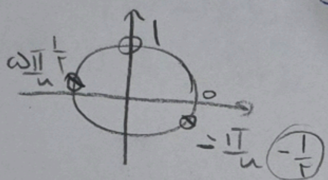
۲)

$-\frac{\pi}{12} < x < \frac{5\pi}{12}$

$-\frac{\pi}{6} < 2x < \frac{5\pi}{6}$

$\sin 2x = \frac{m-1}{4}$

چه مقادیری m؟



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

$max = 1$

$\Rightarrow -\frac{1}{2} < \frac{m-1}{4} < 1$

$-2 < m-1 < 4$

$-1 < m < 5$

۳) $\tan x + \cot x = -3$, $3\pi < 4x < 4\pi$

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

$\frac{1}{\sin^3 x + \cos^3 x} = ?$

$\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x} = \frac{1}{\sin x\cos x}$

$\rightarrow \sin x\cos x = -\frac{1}{3}$

$(\sin x + \cos x)^2 = \underbrace{\sin^2 x + \cos^2 x}_{1} + 2\sin x\cos x$

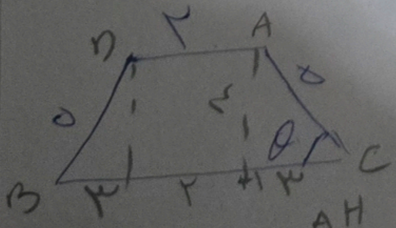
$1 + 2\times -\frac{1}{3} = 1 - \frac{2}{3} = \frac{1}{3}$

$\frac{1}{\underbrace{(\sin x + \cos x)}_{\frac{1}{3}}} \times \frac{1}{(\underbrace{\cos^2 x + \sin^2 x}_{1} - \underbrace{\sin x\cos x}_{\frac{1}{3}})}$; $1 + \frac{1}{3} = \frac{4}{3}$

$= \frac{1}{\frac{4}{9}} = \frac{9}{4}$

۴)

$S = ?$



$\cos\theta = 0/6$

$1 - \cos^2\theta = \sin^2\theta \rightarrow 1 - 0/36 = 0/64 \rightarrow \sin\theta = 0/8$

$\sin\theta = 0/8 = \frac{AH}{5} \rightarrow AH = 4$

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

$\tan(\pi\alpha)\tan(-14\alpha) - \sin(1090\alpha)\cos(720\alpha)$

$k\cos^2 10^\circ$ $\quad u = ?$

$-\tan\left(\frac{3\pi}{2}+10\right)\tan(\pi-10) - \sin(4\pi+10)\cos\left(\frac{3\pi}{2}-10\right)$

$-\cot(10)\tan(10) + \sin(10)\sin(10)$

$-1 + \sin^2(10) = -(1-\sin^2(10)) = -\cos^2 10$

$\rightarrow u = -1$

$A = \sqrt{2}\cos(210)\sin(24\pi) - \sqrt{2}\sin(150)\cos(10\pi)$

$\frac{A}{\cos(270)} = ?$

$\sqrt{2}\times\left(-\frac{\sqrt{2}}{2}\right)\times\sin(24\pi) - \sqrt{2}\times\frac{\sqrt{2}}{2}\times\cos(10\pi)$

$-\frac{1}{2}\times\sin\left(\frac{3\pi}{2}-24\right) - \cos(11\pi-24)$

$+\frac{1}{2}\cos(24) + \cos(24) = \frac{3}{2}\cos(24)$

$\frac{\frac{3}{2}\cos(24)}{\cos(24)} = \frac{3}{2}$

$f(\alpha) = 14\cos^2(24\alpha)\cos^2(4\alpha)\cos^2(12\alpha)\cos^2(48\alpha)$

$f\left(\frac{\pi}{24}\right) = ?$ $\quad 14\cos^2\left(\frac{\pi}{12}\right)\cos^2\left(\frac{\pi}{4}\right)\cos^2\left(\frac{\pi}{2}\right)\cos^2(2\pi)$

$\frac{3}{2}$ $\quad \frac{1}{2}$

$\cos 2\alpha = \cos\frac{\pi}{6} = \frac{\sqrt{3}}{2}$ $\quad \frac{3}{14}\times 14\cos^2\left(\frac{\pi}{12}\right)\cos^2\left(\frac{2\pi}{3}\right) \rightarrow 3\cos^2\left(\frac{\pi}{12}\right)\cos^2\left(\frac{2\pi}{3}\right)$

$\frac{1}{2}$

$\cos 2\alpha = 2\cos^2\alpha - 1 \rightarrow \cos^2\alpha = \frac{\cos 2\alpha + 1}{2}$

$\Rightarrow \left(\frac{\sqrt{3}+2}{2}\right)^2\times\frac{1}{2}\times 3 = \frac{4\sqrt{3}+7}{14}$

$\frac{1-\sin\alpha}{1+2\sin\alpha} = 2$ $\quad \tan\frac{\alpha}{2} = ?$

$1-\sin^2\alpha = \cos^2\alpha$ $\quad 1-\sin\alpha = 4+4\sin\alpha$

$\Rightarrow 1-\frac{9}{25} = \frac{16}{25}$ $\quad -3 = 5\sin\alpha$

$= \frac{4}{5}$ $\quad -\frac{3}{5} = \sin\alpha$

$\cos\alpha = -\frac{4}{5}$

$\frac{\sin\frac{\alpha}{2}}{\cos\frac{\alpha}{2}}$ $\quad \tan\frac{\alpha}{2} \Rightarrow \frac{\frac{3}{\sqrt{10}}}{\frac{1}{\sqrt{10}}} = 3$

$\cos\alpha = 1-2\sin^2\frac{\alpha}{2}$ $\quad \sin\frac{\alpha}{2} \Rightarrow \sqrt{\frac{1-\cos\alpha}{2}} = \sqrt{\frac{1+\frac{4}{5}}{2}}$

$\cos\alpha = 2\cos^2\frac{\alpha}{2} - 1$ $\quad \Rightarrow \sqrt{\frac{1+\cos\alpha}{2}} = \sqrt{\frac{1-\frac{4}{5}}{2}}$

$\sqrt{\frac{1}{10}}$

$\frac{\sin\theta}{1-\cos\theta} + \frac{1+\cos\theta}{\sin\theta}\cdot\frac{2\cos^2\frac{\theta}{2}}{2} = k\cot\frac{\theta}{2}$ $\quad k=?$ (9

$1-\cos\theta \to 2\sin^2\frac{\theta}{2}$

$\sin\theta$

$$\Rightarrow \frac{2\sin\frac{\theta}{2}\cdot\cos\frac{\theta}{2}}{2\sin^2\frac{\theta}{2}} + \frac{2\cos^2\frac{\theta}{2}}{2\sin\frac{\theta}{2}\times\cos\frac{\theta}{2}}$$

$$\cot\frac{\theta}{2} + \cot\frac{\theta}{2} = 2\cot\frac{\theta}{2} \Rightarrow k=2$$

$$k\cot\frac{\theta}{2}$$

α $\quad \sin\alpha = \frac{\sqrt{2}}{10}$ $\quad \cos\left(\frac{11\pi}{2}+\alpha\right) = ?$

$\cos(\quad$
$\sin)$.

$$\cos\left(\frac{8\pi+3\pi}{2}\right) = \cos\left(2\pi+\frac{3\pi}{2}+\alpha\right) \quad (10$$

$$= \cos\left(\frac{3\pi}{2}+\alpha\right)$$

$$\cos\frac{3\pi}{2}\cos\alpha - \sin\frac{3\pi}{2}\sin\alpha = +\frac{\sqrt{2}}{2}\times\frac{\sqrt{98}}{10} - \frac{\sqrt{2}}{2}\times\frac{\sqrt{2}}{10}$$

$$\cos\alpha = \sqrt{1-\frac{2}{100}}$$

$$\cos\alpha = \frac{\sqrt{98}}{10}$$

$$\frac{\sqrt{196}}{20} - \frac{2}{20} = \frac{14-2}{20} = \frac{12}{20} = \frac{6}{10} = 0/6$$