شهاب جمعت تکلیف ۲۸ کلاس دوشنبه ها

سوال ۱)

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

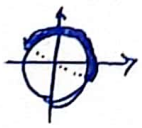
$\frac{\cos\alpha}{\sin\alpha} = \frac{\cos\alpha}{|\sin\alpha|}$ $\quad \frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{|\cos\alpha|}$

$\sin\alpha = |\sin\alpha|$ $\quad \cos\alpha = |\cos\alpha| \rightarrow \cos\alpha > 0$ (II) $\xrightarrow{\text{II و I}}$ دربیع اول

$\sin\alpha > 0$ (I)

سوال ۲)

$\sin^2 x = \frac{m-1}{4}$ $\quad -\frac{\pi}{12} < x < \frac{3\pi}{12}$ $\quad -\frac{\pi}{6} < 2x < \frac{3\pi}{6}$



$-\frac{1}{2} < \sin 2x \leq 1$ $\quad \frac{-1}{2} < \frac{m-1}{4} \leq 1$ $\quad -2 < m-1 \leq 4$

$-1 < m \leq 5$

سوال ۳)

$\tan x + \cot x = -3$ $\quad 3\pi < 4x < 4\pi$

$\frac{1}{\sin\alpha\cos\alpha} = -3$ $\quad \frac{3\pi}{4} < x < \pi$

$2\sin\alpha\cos\alpha = \frac{-2}{3}$ $\quad \cos x < 0 \quad \sin x > 0$

$|\cos x| > \sin x$

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

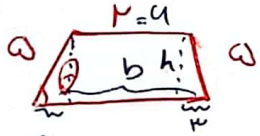
$\frac{1}{\sin^3 x + \cos^3 x} = \frac{1}{(\sin x+\cos x)(\sin^2 x - \sin x\cos x + \cos^2 x)}$

$= \frac{1}{(-\frac{1}{\sqrt{3}})(1+\frac{1}{3})} = \frac{1}{\frac{-1}{\sqrt{3}} \times \frac{4}{3}} = \frac{-4\sqrt{3}}{4}$

سوال ۴)

$\cos\theta = 0/4$ $\quad \sin\theta = \sqrt{1-\cos^2\theta}$

$\sin\theta = \sqrt{1-0/16} = 0/8$



قاعده بزرگ $= 2+3+3 = 8$

قاعده کوچک $= 2$

$5\cos\theta = 5\times 0/4 = 3$

$h = 5\sin\theta = 5\times 0/8 = 4$

$S = \frac{(a+b)\times h}{2}$

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

سوال ۵)

$\tan(28^\circ)\tan(-17^\circ) - \sin(109^\circ)\cos(25^\circ) = k\cos^2 10^\circ$

$(-\cot(10^\circ))(\tan(10^\circ)) - (\sin(10^\circ))(-\sin(10^\circ)) = k\cos^2 10^\circ$

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

$\cos^2 10^\circ$

سوال ۶)

$$A=\sqrt{3}\cos(210^\circ)\sin(243^\circ)-\sqrt{2}\sin(135^\circ)\cos(153^\circ)$$

$$A=\sqrt{3}\left(\frac{-\sqrt{3}}{2}\right)\left(-\cos(27^\circ)\right)-\sqrt{2}\left(\frac{\sqrt{2}}{2}\right)\left(-\cos(27^\circ)\right)=\cos(27^\circ)\left(\frac{3}{2}+1\right)=\frac{5}{2}\cos(27^\circ)$$

$\frac{5}{2}$ برابر

سوال ۷)

$$f(x)=16\cos^2(3x)\cos^2(6x)\cos^2(12x)\cos^2(24x) \qquad f\left(\frac{\pi}{36}\right)$$

$$f(x)=\frac{\left(4\sin(3x)\cos(3x)\cos(6x)\cos(12x)\cos(24x)\right)^2}{\sin^2(3x)}=\frac{\left(2\sin(6x)\cos(6x)\cos(12x)\cos(24x)\right)^2}{\sin^2(3x)}$$

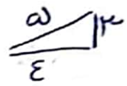
$$=\frac{\left(\sin(12x)\cos(12x)\cos(24x)\right)^2}{\sin^2(3x)}=\frac{\left(\sin(24x)\cos(24x)\right)^2}{4\sin^2(3x)}=\frac{\sin(48x)^2}{16\sin^2(3x)}$$

$$\frac{\sin\left(\frac{48\pi}{36}\right)^2}{16\sin\left(\frac{\pi}{12}\right)^2}=\frac{\left(\frac{3}{4}\right)}{4(2-\sqrt{3})}=\frac{3(2+\sqrt{3})}{16} \qquad \sin(15^\circ)=\frac{\sqrt{2-\sqrt{3}}}{2}$$

سوال ۸)

$$\frac{1-\sin x}{1+\sin x}=4 \qquad 4\sin x+4=-\sin x+1 \qquad 5\sin x=-3 \qquad \sin x=\frac{-3}{5}$$

$\cos x<0 \longrightarrow$



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

$$\tan\frac{x}{2}=\frac{\sin\alpha}{1+\cos\alpha}=\frac{-\frac{3}{5}}{1+\left(\frac{-4}{5}\right)}=\frac{-\frac{3}{5}}{\frac{1}{5}}=-3$$

سوال ۹)

$$\underbrace{\frac{\sin\theta}{1-\cos\theta}}_{\cot\frac{\theta}{2}}+\underbrace{\frac{1+\cos\theta}{\sin\theta}}_{\cot\frac{\theta}{2}}=2\cot\frac{\theta}{2}=k\cot\frac{\theta}{2} \Rightarrow \boxed{k=2}$$

سوال ۱۰)

$$\sin\alpha=\frac{\sqrt{2}}{10} \qquad \cos\alpha=\sqrt{\frac{100-2}{100}}=\sqrt{\frac{98}{100}} \Rightarrow \cos\alpha=\frac{7\sqrt{2}}{10}$$

$$\cos\left(\frac{11\pi}{4}+\alpha\right)$$

$$\cos\left(\frac{3\pi}{4}+\alpha\right)=\frac{\sqrt{2}}{2}\left(-\cos\alpha-\sin\alpha\right)=-\frac{1}{\sqrt{2}}\left(\frac{\sqrt{2}}{10}\times 8\right)=\frac{-8}{10}=\boxed{\frac{-4}{5}}$$