نام و نام خانوادگی: سید آرین میرلطفی — پاسخنامه تشریحی تکلیف شماره ۲۱ — کلاس چهارشنبه ها یازدهم

۱

$$\frac{\cos\alpha}{\sin\alpha} = \frac{\cos\alpha}{|\sin\alpha|} \Longrightarrow \sin\alpha \geq 0 \quad ①$$

$$\frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|} \Longrightarrow \cos\alpha \geq 0 \quad ②$$

$①, ② \longrightarrow \alpha \in$ ناحیه اول

۲

$$\sin(2x) = \frac{m-1}{4} \quad , \quad \frac{-\pi}{12} < x < \frac{5\pi}{12}$$

$$x = \frac{-\pi}{12} \Longrightarrow \sin\left(\frac{-\pi}{6}\right) = \frac{-1}{2} = \frac{m-1}{4} \Longrightarrow m = -1 \quad ①$$

$$x = \frac{3\pi}{12} \Longrightarrow \sin\left(\frac{\pi}{2}\right) = 1 = \frac{m-1}{4} \Longrightarrow m = 5 \quad ②$$

$$①, ② \longrightarrow \underline{m \in (-1, 5]}$$

۳

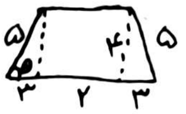
$$\tan x + \cot x = \frac{2}{\sin 2x} = -3 \longrightarrow \sin 2x = 2\sin x\cos x = \frac{-2}{3} \quad ①$$

$$(\sin x + \cos x)^2 = 1 + 2\sin x\cos x \xrightarrow{①} \sin x + \cos x = \pm\sqrt{\frac{1}{3}} \quad ②$$

$$3\pi < 4x < 4\pi \longrightarrow \frac{3\pi}{4} < x < \pi \longrightarrow \sin x > 0 , \cos x < 0 , |\cos x| > \sin x \Longrightarrow \sin x + \cos x < 0 \xrightarrow{②} \sin x + \cos x = \frac{-1}{\sqrt{3}}$$

$$\frac{1}{(\sin x + \cos x)(1 - \sin x\cos x)} = \frac{1}{\frac{-1}{\sqrt{3}} \times \frac{4}{3}} = \boxed{\frac{-3\sqrt{3}}{4}}$$

۴



$$5 \times \cos\theta = 5 \times 0/6 = \boxed{3}$$

$$\longrightarrow S = \left(\frac{2+8}{2}\right) \times 4 = \underline{\underline{20}}$$

۵

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

$$\longrightarrow -\cot(15) \times \tan(15) - (\sin(15))(-\sin(15)) = \sin^2(15) - 1 \quad ①$$

$$\sin^2\alpha + \cos^2\alpha = 1 \xrightarrow{①} \sin^2(15) - 1 = -\cos^2(15) \longrightarrow K = \boxed{-1}$$

۶

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

$$\frac{\frac{5}{2}\cos(27^\circ)}{\cos(27^\circ)} = \boxed{\frac{5}{2}}$$

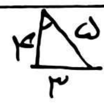
۷

$$16\cos^2\frac{\pi}{12}\times\cos^2\frac{\pi}{6}\times\cos^2\frac{\pi}{3}\times\cos^2\frac{2\pi}{3} = \frac{3}{4}\times\frac{1}{\cancel{4}}\times\frac{1}{\cancel{4}}\times\cancel{16}\cos^2\frac{\pi}{12}$$

$$\rightarrow \frac{3}{4}\left(\frac{1+\cos\frac{\pi}{6}}{2}\right) = \frac{3\sqrt{3}+6}{16}$$

۸

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



$$\rightarrow \cos x = \frac{-4}{5} \quad , \quad \tan\left(\frac{x}{2}\right) = \frac{1-(\cos x)}{\sin x} \Rightarrow \frac{\frac{9}{5}}{\frac{-3}{5}} = \boxed{-3}$$

۹

$$\frac{2\sin\frac{\theta}{2}\cos\frac{\theta}{2}}{2\sin^2\frac{\theta}{2}} + \frac{2\cos^2\frac{\theta}{2}}{2\sin\frac{\theta}{2}\cos\frac{\theta}{2}} = \cot\frac{\theta}{2}+\cot\frac{\theta}{2} = 2\cot\frac{\theta}{2}$$

$$\rightarrow \boxed{k=2}$$

۱۰

$$\sin\alpha = \frac{\sqrt{2}}{10} \Rightarrow$$

$$\sin\left(\frac{11\pi}{4}+\alpha\right) = \sin\left(\frac{3\pi}{4}+\alpha\right) = \cos\frac{3\pi}{4}\cos\alpha - \sin\frac{3\pi}{4}\sin\alpha$$

$$\rightarrow \frac{-\sqrt{2}}{2}\left(-\frac{\sqrt{98}}{10}\right) - \left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{10}\right) = \frac{\sqrt{196}}{20} - \frac{2}{20} = \boxed{\frac{12}{20}}$$