زهرا سیرانی

(۱ الف) $\tan\frac{11\pi}{4} + \sin\frac{15\pi}{4} \cdot \cos\frac{13\pi}{4} =$

$\tan\left(\frac{5\pi}{4} + \frac{3\pi}{4}\right) = -1$ → $\sin\left(\frac{12\pi}{4} + \frac{3\pi}{4}\right) = -\frac{\sqrt{2}}{2}$ → $\cos\left(3\pi + \frac{\pi}{4}\right) = \boxed{\frac{\sqrt{2}}{2}}$

ب) $\tan\frac{17\pi}{4} + \sin\frac{11\pi}{3} + \cos\frac{10\pi}{3} = \tan\left(\frac{12\pi}{4} + \frac{5\pi}{4}\right) = -\frac{\sqrt{3}}{3}$

$\sin\left(\frac{9\pi}{3} + \frac{2\pi}{3}\right) = -\frac{\sqrt{3}}{2} + \cos\left(\frac{9\pi}{3} + \frac{\pi}{3}\right) = -\frac{1}{2}$ → $-\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{3} - \frac{1}{2}$

$\frac{3}{4} - \frac{1}{2} = \boxed{\frac{5}{4}}$

(۲ $\frac{3\cos x - \sin x}{\cos x + \sin x} \xrightarrow{\div \sin}$ $\frac{\frac{3\cos x}{\sin x} - \frac{\sin x}{\sin x}}{\frac{\cos x}{\sin x} + \frac{\sin x}{\sin x}} = \frac{3\cot x - 1}{\cot x + 1} = \frac{11}{5}$

(۳ $\sin\alpha = 2\cos\alpha$ $\quad 1 + \tan^2 = \frac{1}{\cos^2}$ → $5 = \frac{1}{\cos^2}$ → $\cos^2 = \frac{1}{5}$

در ناحیه سوم $\cos x$ منفی

$\cos = -\frac{\sqrt{5}}{5}$

(۴ الف) $= \cos\left(\frac{5\pi}{4} + \frac{3\pi}{4} + \alpha\right)$ → $\cos\left(\frac{8\pi}{4} + \alpha\right) = \cos\frac{3\pi}{4}\cos\alpha - \sin\frac{3\pi}{4}\cdot\sin\alpha$

$-\left(-\frac{\sqrt{2}}{2} \cdot -\frac{\sqrt{2}}{10}\right) - \left(\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{10}\right) = \frac{12}{20} = \frac{4}{5}$

$\sin^2 + \cos^2 = 1$ → $\frac{2}{100} + \cos^2 = 1$ → $\cos^2 = \frac{98}{100}$ → $\cos = \frac{7\sqrt{2}}{10}$ → $\boxed{\frac{7\sqrt{2}}{10}}$

ب) $\sin\left(\frac{12\pi}{4} + \frac{\pi}{4} + \alpha\right)$ → $\sin(225° + \alpha)$ → $\sin 225 \cdot \cos\alpha + \sin\alpha \cdot \cos$

$\left(-\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{10}\right) + \left(\frac{7\sqrt{2}}{10} \cdot \left(-\frac{\sqrt{2}}{2}\right)\right)$

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

$\frac{98}{100} + \cos^2 = 1$ → $\cos^2 = \frac{2}{100}$ → $\cos = \frac{\sqrt{2}}{10}$ → $+\frac{\sqrt{2}}{10}$

$1 + \tan^2\alpha = \frac{1}{\sin^2\alpha}$ → $\sin^2\alpha = \frac{49}{50}$ → $\sin\alpha = \frac{7\sqrt{2}}{10}$ → $\frac{7\sqrt{2}}{10}$

$-\frac{7}{20} - \frac{14}{20} = \boxed{-\frac{21}{10}} = -\frac{14}{20}$

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(۵ $۲\sin^۲\alpha + \cos^۲\alpha = \frac{۴}{۳} \rightarrow ۴\sin^۲\alpha + ۳\cos^۲\alpha = ۴$

$۴(۱-\cos^۲\alpha) + ۳\cos^۲\alpha = ۴$

$۴ - ۴\cos^۲\alpha + ۳\cos^۲\alpha = ۴ \rightarrow -۳\cos^۲\alpha = -۴$

$\cos^۲\alpha = \frac{۴}{۳}$

$۱ + \tan^۲\alpha = \frac{۱}{\cos^۲\alpha} \rightarrow \tan^۲ = \frac{۳}{۴} - ۱ \rightarrow \tan^۲ = \frac{۱}{۴}$

(۶ $S_{\Delta} = ab\sin\alpha = ۵۴ \rightarrow \frac{۱}{۲} \times \sqrt{۳} \times ۹ \times \sin\alpha = ۴۱۵ \rightarrow ۳\sqrt{۳} \times \sin\alpha = ۴۱۵$

$\sin\alpha = \frac{۴۱۵}{۳\sqrt{۳}} = \frac{\sqrt{۳}}{۲}$ → ۱۲۰° یا ۶۰°

$\frac{\max}{\min} = ۲$

(۷ $S = ۵۴ \rightarrow ۲۷ = \frac{۱}{۲} \times \frac{۱}{۲} \times ۲k \times ۳k \rightarrow ۲۷ = \frac{۳k^۲}{۲} \rightarrow k^۲ = ۱۸ \rightarrow k = \pm ۳\sqrt{۲}$

$۲(۹\sqrt{۲}, ۹\sqrt{۲}) = ۳۰\sqrt{۲}$

(۸ $\frac{۱}{۲} \times ۵ \times V \times \sin A = \frac{۱}{۲} \times ۴ \times V \times \sin A \rightarrow$

$\rightarrow \frac{۱}{۲} \times V^۲ \sin A (۵-۴) = ۳۱۵ \times \sin A = ۱۷۵ \rightarrow \sin A = \frac{۱}{۲}$

$۱ + \cot^۲ = \frac{۱}{\sin^۲} \rightarrow ۱ + \cot^۲ = ۴ \rightarrow \cot = \pm\sqrt{۳} \rightarrow \cot A = \sqrt{۳}$

چون → $\sin, \cos +$ ← مثبت $\tan = \frac{۱}{\sqrt{۳}} = \frac{\sqrt{۳}}{۳}$

(۹ $۲BN = ۳NC \rightarrow BN = ۳$ $NC = ۲$ $S_{ABC} = ۲S_{BMN}$

$AB = BM + AM$ $S = \frac{۱}{۲} \times BC \times AB \times \sin B \rightarrow \frac{۱}{۲} \times ۳ \times BM \times \sin B$

$AB \times ۵ = ۲BM \times ۳ \rightarrow AB = \frac{۹}{۵} BM \rightarrow AM = \frac{۴}{۵} BM \rightarrow AM = \frac{۴}{۵} BM$

$\frac{BM}{AM} = \frac{BM}{\frac{۴}{۵} BM} = \frac{۵}{۴}$

سوال ۱۰

$\frac{1}{\sqrt{\cos^2}} + \tan\alpha = \frac{1+\sin\alpha}{|\cos\alpha|} \rightarrow \frac{1}{\cos\alpha} + \frac{\sin}{\cos} = \frac{1}{\cos\alpha} + \frac{\sin\alpha}{|\cos\alpha|}$

$-\cos\alpha = |\cos\alpha| \rightarrow \cos\alpha < 0$ ناحیه ۲ و ۳

$\frac{|\sin\alpha|}{\cos\alpha} = \frac{-1}{\cot\alpha} \rightarrow \frac{|\sin\alpha|}{\cos\alpha} = \frac{-\sin\alpha}{\cos\alpha} \rightarrow |\sin\alpha| = \underbrace{-\sin\alpha}_{\ominus}$ ناحیه ۳ و ۴

$\Rightarrow$ ناحیه ۳ (اشتراک)