زهرا سرابی

۲۰

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

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

$\cos\left(3\pi + \frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

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

ب) $\tan\frac{17\pi}{4} + \sin\frac{11\pi}{3} + \cos\frac{10\pi}{3} = \tan\left(\frac{12\pi}{4} + \frac{5\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

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

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

۳) $\frac{4\cos\alpha - \sin\alpha}{\cos\alpha + \sin\alpha} \xrightarrow{\div\sin\alpha} \frac{\frac{4\cos\alpha}{\sin\alpha} - \frac{\sin\alpha}{\sin\alpha}}{\frac{\cos\alpha}{\sin\alpha} + \frac{\sin\alpha}{\sin\alpha}} = \frac{4\cot\alpha - 1}{\cot\alpha + 1} = \frac{11}{5}$

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

α در ناحیه سوم $\cos\alpha$ منفی

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

۵) الف) $= \cos\left(\frac{5\pi}{4} + \frac{4\pi}{4} + \alpha\right)$ → $\cos\left(\frac{9\pi}{4} + \alpha\right) = \cos\frac{9\pi}{4}\cos\alpha - \sin\frac{9\pi}{4}\sin\alpha$

$-\left(-\frac{\sqrt{2}}{2} \cdot -\frac{\sqrt{2}}{10}\right) - \left(\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{10}\right) = \frac{12}{20} = \frac{3}{5}$

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

ب) $\sin\left(\frac{12\pi}{4} + \frac{\pi}{4} + \alpha\right)$ → $\sin(225^\circ + \alpha)$ → $\sin 225 \cdot \cos\alpha + \sin\alpha \cdot \cos 45^\circ$

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

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

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

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

$-\frac{2}{20} - \frac{14}{20} = \left|-\frac{8}{10}\right| = -\frac{14}{20}$

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۵) $۳\sin^۲\alpha + \cos^۲\alpha = \frac{۴}{۳} \rightarrow 4\sin^۲\alpha + ۳\cos^۲\alpha = ۴$

$4(1-\cos^۲\alpha) + ۳\cos^۲\alpha = ۴$

$4 - 4\cos^۲\alpha + ۳\cos^۲\alpha = ۴ \rightarrow -۳\cos^۲\alpha = -۴$

$\cos^۲\alpha = \frac{۴}{۳}$

$1 + \tan^۲\alpha = \frac{1}{\cos^۲\alpha} \rightarrow \tan^۲ = \frac{۳}{۴} - 1 \rightarrow \tan^۲ = \frac{1}{۴}$

۴) $S_\Delta = ab\sin\alpha = ۵۴ \rightarrow \frac{1}{۲} \times \sqrt{۳} \times 4 \times \sin\alpha = ۴۱۵ \rightarrow ۳\sqrt{۳} \times \sin\alpha = ۴۱۵$

$\sin\alpha = \frac{۴۱۵}{۳\sqrt{۳}} = \frac{\sqrt{۳}}{۲} \rightarrow ۱۲۰^\circ$, ۶۰°

$\frac{\max}{\min} = ۲$

۷) $S = ۵۴ \rightarrow ۲۷ = \frac{1}{۲} \times \frac{1}{۲} \times ۲k \times ۳k \rightarrow ۲۷ = ۳k^۲ \rightarrow k^۲ = ۱۸ \rightarrow k = \pm ۳\sqrt{۲}$

$۲(۴\sqrt{۲}, ۹\sqrt{۲}) = ۳۰\sqrt{۲}$

۸) $\frac{1}{۲} \times ۵ \times V \times \sin A = \frac{1}{۲} \times ۴ \times V \times \sin A \rightarrow$

$\rightarrow \frac{1}{۲} \times V \times \sin A (۵-۴) = ۳,۵ \times \sin A = ۱,۷۵ \rightarrow \sin A = \frac{1}{۲}$

$1 + \cot^۲ = \frac{1}{\sin^۲} \rightarrow 1 + \cot^۲ = ۴ \rightarrow \cot = \pm\sqrt{۳} \rightarrow \cot A = \sqrt{۳}$

$\tan = \frac{1}{\sqrt{۳}} = \frac{\sqrt{۳}}{۳}$ ← مثبت

چون $\rightarrow \sin, \cos +$

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

$AB = BM + AM$ $\quad S = \frac{1}{۲} \times BC \times AB \times \sin B \rightarrow \frac{1}{۲} \times ۳ \times BM \times \sin B$

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

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

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سوال ۱۰

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

۴

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

$\frac{|\sin\alpha|}{\cos\alpha} = \frac{-1}{\cot\alpha} \longrightarrow \frac{|\sin\alpha|}{\cos\alpha} = \frac{-\sin\alpha}{\cos\alpha} \longrightarrow |\sin\alpha| = \underbrace{-\sin\alpha}_{(-)}$

$\sin\alpha$ نا ناحیه ۳ و ۴

$\Rightarrow$ ناحیه ۳ (اشتراک)