Date: Sub: ۱۸,۲۵ سنبا فاضی

۱- (۲)

الف) $\tan\frac{8\pi+3\pi}{4} + \sin\frac{12\pi+3\pi}{4} \times \cos\frac{12\pi+\pi}{4} =$

$\tan 225^\circ + \sin 315^\circ \times \cos 225^\circ = (-1) + \left(-\frac{\sqrt{2}}{2} \times -\frac{\sqrt{2}}{2}\right) = -\frac{1}{2}$ ✓

ب) $\tan\frac{12\pi+5\pi}{6} \times \sin\frac{6\pi+4\pi}{3} + \cos\frac{6\pi+6\pi}{3} =$

$\tan 150^\circ \times \sin 300^\circ + \cos 240^\circ = -\frac{1}{\sqrt{3}} \times \left(-\frac{\sqrt{3}}{2}\right) + \left(-\frac{1}{2}\right) = 0$ ✓

۲- (۲)

$\cot x = 4 \longrightarrow \frac{\cos x}{\sin x} = 4 \rightarrow \cos x = 4\sin x$

$\frac{3(4\sin x) - \sin x}{4\sin x + \sin x} = \frac{11\sin x}{5\sin x} = \frac{11}{5}$ ✓

۳- (۲)

$\sin\alpha = 2\cos\alpha \rightarrow \sqrt{1-\cos^2\alpha} = 2\cos\alpha$

$1-\cos^2\alpha = 4\cos^2\alpha$

$1 = 5\cos^2\alpha \rightarrow \cos^2\alpha = \frac{1}{5} \rightarrow \cos\alpha = \pm\frac{\sqrt{5}}{5}$ (ربع سوم)

$-\frac{\sqrt{5}}{5}$ ✓

۴- الف) (۲)

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

$\sin\alpha = \frac{\sqrt{2}}{10} \rightarrow \sqrt{1-\cos^2\alpha} = \frac{\sqrt{2}}{10} \rightarrow 1-\cos^2\alpha = \frac{1}{50}$ (ربع دوم)

$\cos^2\alpha = \frac{49}{50} \rightarrow \cos\alpha = \pm\frac{7}{\sqrt{50}}$ $\quad \cos\alpha = -\frac{7}{\sqrt{50}}$

$-\frac{\sqrt{2}}{2} \times \left(-\frac{7}{\sqrt{50}}\right) + \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{10} = \frac{8}{10} = \frac{4}{5}$ ✓

$\frac{7}{10}$ $\quad \frac{1}{10}$

Date: Sub:

۴- $\sin\left(\frac{۱۳\pi}{۴}+a\right) = \sin\frac{۱۳\pi}{۴}\cos a + \cos\frac{۱۳\pi}{۴}\sin a$

$\frac{۱}{\cos^۲ a} = ۱ + \frac{۱}{۴۹} \rightarrow \frac{۱}{\cos^۲ a} = \frac{۵۰}{۴۹} \rightarrow \cos^۲ a = \frac{۴۹}{۵۰} \rightarrow \cos a = \pm\frac{۷}{\sqrt{۵۰}}$

$\cos a = \frac{۷}{\sqrt{۵۰}}$ (زاویه اول)

$\sin a = \frac{۱}{\sqrt{۵۰}}$

$\left(-\frac{\sqrt{۲}}{۲}\times\frac{۷}{\sqrt{۵۰}}\right)+\left(\frac{-\sqrt{۲}}{۲}\times\frac{۱}{\sqrt{۵۰}}\right) = -\frac{۸}{۱۰} = \boxed{-\frac{۴}{۵}}$ ✓

$-\frac{۷}{۱۰}$ $\quad -\frac{۱}{۱۰}$

۵- (۲)

$۲\sin^۲\alpha + (۱-\sin^۲\alpha) = \frac{۴}{۳}$

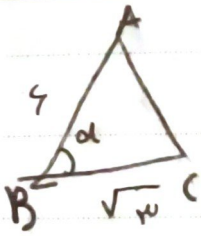
$۲\sin^۲\alpha + ۱ - \sin^۲\alpha = \frac{۴}{۳}$

$\sin^۲\alpha = \frac{۱}{۳}$

$\cos^۲\alpha = ۱-\sin^۲\alpha \rightarrow \cos^۲\alpha = \frac{۲}{۳}$

$\tan^۲\alpha = \frac{\sin^۲\alpha}{\cos^۲\alpha} = \frac{\frac{۱}{۳}}{\frac{۲}{۳}} = \boxed{\frac{۱}{۲}}$ ✓

۶- (۲)



$\frac{۱}{۲}\times۶\times\sqrt{۳}\times\sin a = ۴,۵$

$\sqrt{۳}\times\sin a = ۱,۵$

$\sin a = \frac{۱,۵\cdot\sqrt{۳}}{\sqrt{۳}\cdot\sqrt{۳}} = \frac{۱,۵\sqrt{۳}}{۳} = \frac{۱}{۲}\times\sqrt{۳} = \frac{\sqrt{۳}}{۲}$

$a = ۶۰^\circ$ یا ۱۲۰°

$\frac{۱۲۰}{۶۰} = \boxed{۲}$ ✓

۷- (۲)

$a\times b\times\sin ۱۵۰^\circ = ۵۴$

$ab\times\frac{۱}{۲} = ۵۴ \rightarrow ab = ۱۰۸ \rightarrow a\times\frac{۳a}{۲} = ۱۰۸ \rightarrow \frac{۳a^۲}{۲} = ۱۰۸$

$\frac{a}{b} = \frac{۲}{۳} \rightarrow b = \frac{۳a}{۲}$

$۳a^۲ = ۲۱۶$

$a^۲ = ۷۲$

$a = \sqrt{۷۲} \rightarrow ۶\sqrt{۲}$

محیط $= ۲(۶\sqrt{۲}+۹\sqrt{۲}) = \boxed{۳۰\sqrt{۲}}$ ✓

Date: Sub:

۸- $S_{ABC} - S_{ADE} = 1,75$ (۲)

$\frac{1}{2} \times 5 \times 7 \times \sin \hat{A} - \frac{1}{2} \times 7 \times 4 \times \sin \hat{A} = 1,75$

$\frac{35}{2} \sin A - 14 \sin \hat{A} = 1,75$

$17,5 \sin A - 14 \sin \hat{A} = 1,75$

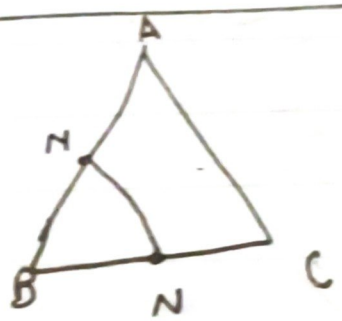
$3 \sin A = 1,75$

$4 \sin A = 1 \rightarrow \sin \hat{A} = \frac{1}{4}$

$\cos \hat{A} = \sqrt{1 - \sin^2 \hat{A}} = \sqrt{1 - \frac{1}{16}} = \sqrt{\frac{15}{16}} = \frac{\sqrt{15}}{4}$

$\tan \hat{A} = \frac{\frac{1}{4}}{\frac{\sqrt{15}}{4}} = \frac{1}{\sqrt{15}} = \frac{\sqrt{15}}{15}$ ✓

۹- (۲)



$3\overline{BN} = 4NC \rightarrow NC = \frac{3}{4} BN$

$\frac{1}{2} \times AB \times BC \times \sin B = 3 \times \frac{1}{2} \times BM \times BN \times \sin B$

$(BM + AM) \times (BN + NC) = 4 BM \times BN$

$(BM + AM) \times (\frac{7}{4} BN) = 3 \times BM \times BN$

$\frac{7}{4} (BM + AM) = 3 BM$

$\frac{7}{4} BM + \frac{7}{4} AM = 3 BM$

$\frac{7}{4} AM = \frac{5}{4} BM \rightarrow 7 AM = 5 BM$

$\frac{BM}{AM} = \frac{7}{5}$ ✓

۱۰- ناحیه سوم ✓ (۰٫۲۵)

راه حل ۲:

$$\frac{|\sin\alpha|}{\cos\alpha} = \frac{-1}{\cot\alpha} = -\frac{\sin\alpha}{\cos\alpha} \rightarrow \sin\alpha < 0$$

} → ناحیه سوم

$$\frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1+\sin\alpha}{|\cos\alpha|} \rightarrow -\frac{\sin\alpha}{|\cos\alpha|} = \frac{\sin\alpha}{\cos\alpha} \rightarrow \cos\alpha < 0$$