دهم دفتر B

سری ۱۸

ماریناامین الرعایا

۲۰ عالی

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Subject:

Year: Month: Day:

۱- الف) $\tan\frac{11\pi}{4}+\sin\frac{15\pi}{4}\cos\frac{13\pi}{4} \Rightarrow \tan(2\pi+\frac{3\pi}{4})=\tan\frac{3\pi}{4}=-1$

$\sin\frac{15\pi}{4}=\sin(3\pi+\frac{3\pi}{4})=-\sin\frac{3\pi}{4}=-\frac{\sqrt2}{2}$

$\cos\frac{13\pi}{4}=\cos(2\pi+\frac{5\pi}{4})=\cos\frac{5\pi}{4}=-\frac{\sqrt2}{2}$

$\Rightarrow -1+(-\frac{\sqrt2}{2}\times\frac{\sqrt2}{2})=-1+\frac{2}{4}=\boxed{\frac{-1}{2}}$

ب) $\tan\frac{17\pi}{6}\sin\frac{11\pi}{3}+\cos\frac{10\pi}{3} \Rightarrow \tan(2\pi+\frac{5\pi}{6})=\tan\frac{5\pi}{6}=-\frac{\sqrt3}{3}$

$\sin\frac{11\pi}{3}=(3\pi+\frac{2\pi}{3})=-\sin\frac{2\pi}{3}=-\frac{\sqrt3}{2}$

$\cos\frac{10\pi}{3}=(3\pi+\frac{\pi}{3})=-\cos\frac{\pi}{3}=-\frac12$

$\Rightarrow (-\frac{\sqrt3}{3}\times-\frac{\sqrt3}{2})-\frac12=\frac{3}{6}-\frac12=0$

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۲- $\frac{3\cos\alpha-\sin\alpha}{\cos\alpha+\sin\alpha} \Rightarrow \frac{3\cot\alpha-1}{\cot\alpha+1}=\frac{3(4)-1}{4+1}=\frac{12-1}{5}=\boxed{\frac{11}{5}}$

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۳- $\sin\alpha=2\cos\alpha \to \sin^2\alpha+\cos^2\alpha=1 \to 4\cos^2\alpha+\cos^2\alpha=1$

$5\cos^2\alpha=1 \to \cos^2\alpha=\frac15$

$\cos\alpha=-\frac{1}{\sqrt5}$ یا $-\frac{\sqrt5}{5}$

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۴- الف) $\cos(2\pi+\frac{3\pi}{4}+\alpha)=\cos\frac{3\pi}{4}\cos\alpha-\sin\frac{3\pi}{4}\sin\alpha=+\frac{7}{10}-\frac{2}{20}=\boxed{\frac{9}{10}}$

$-\frac{\sqrt2}{2}\times-\frac{\sqrt{98}}{10}-\frac{\sqrt2}{2}\times\frac{\sqrt2}{10}$

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

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ب) $\sin(2\pi+\frac{5\pi}{4}+\alpha)=\sin\frac{5\pi}{4}\cos\alpha+\sin\alpha\cos\frac{5\pi}{4}=-\frac{14}{20}-\frac{2}{20}=\frac{-16}{20}=\boxed{\frac{-4}{5}}$

$-\frac{\sqrt2}{2}\times\frac{7\sqrt2}{10}+\frac{\sqrt2}{10}\times-\frac{\sqrt2}{2}$

$1+\cot^2\alpha=\frac{1}{\sin^2\alpha} \to 1+\frac{49}{50}=\frac{1}{\sin^2\alpha} \to 50\sin^2\alpha=1 \to \sin^2\alpha=\frac{1}{50} \to \sin\alpha=\frac{1}{\sqrt{50}}\times\frac{\sqrt{50}}{\sqrt{50}}=\frac{5\sqrt2}{50}=\frac{\sqrt2}{10}$

$\cos\alpha=\frac{7}{\frac{10}{\sqrt2}} \leftarrow \frac{10\cos\alpha}{\sqrt2}=7 \leftarrow \frac{\cos\alpha}{\frac{\sqrt2}{10}}=7$

$\cos\alpha=\frac{7\sqrt2}{10}$

۵- $2\sin^2x+\cos^2x=\frac43 \to \sin^2x+\underbrace{\sin^2x+\cos^2x}_{1}=\frac43$

$\sin^2x=\frac43-1 \to \sin^2x=\frac13$

$\cos^2x+\sin^2x=1 \to \cos^2x=1-\frac13 \to \cos^2x=\frac23$

$\tan^2x=\frac{\frac13}{\frac23}=\frac36=\frac12$

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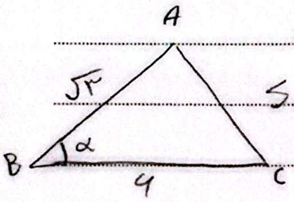

مساحت $=4/5$

$S=\frac12(\sqrt3)(6)\times\sin\alpha=3\sqrt3\times\sin\alpha=4/5 \to \sin\alpha=\frac{4/5}{3\sqrt3}$

$\sin\alpha=\frac{4/5\times\sqrt3}{9}=\frac{\sqrt3}{2}$

$\alpha=120^\circ, 60^\circ$

$\frac{120}{60}=2$

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مارینا امین الرعایا

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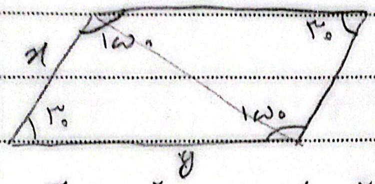

$S = \frac{۲}{۳} y \times y \times \sin ۳۰ = \frac{۱}{۳} y^۲$ ($\sin ۳۰ = \frac{۱}{۲}$)

$\frac{۱}{۳} y^۲ = ۵۴ \longrightarrow y^۲ = ۱۶۲ \longrightarrow y = +\sqrt{۱۶۲}$

$\frac{x}{y} = \frac{۲}{۳} \longrightarrow x = \frac{۲}{۳} y$

محیط $= \sqrt{۱۶۲} + \sqrt{۱۶۲} + \frac{۲}{۳}\sqrt{۱۶۲} + \frac{۲}{۳}\sqrt{۱۶۲} = ۲\sqrt{۱۶۲} + \frac{۴}{۳}\sqrt{۱۶۲}$

$\boxed{\frac{۱۰}{۳}\sqrt{۱۶۲}}$ یا $\boxed{۱۰\sqrt{۱۸}}$

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$\hat{A}BC$ مساحت $= \sin A \times ۵ \times ۷ \times \frac{۱}{۲} = \frac{۳۵}{۲} \sin A$

$\hat{A}DE$ مساحت $= \sin A \times ۷ \times ۴ \times \frac{۱}{۲} = ۱۴ \sin A$

$\frac{۳۵}{۲} \sin A - ۱۴ \sin A = ۱/۷۵$

$۳/۵ \sin A = ۱/۷۵ \longrightarrow \sin A = ۰/۵ = \frac{۱}{۲}$

$A = ۳۰^\circ \quad \tan ۳۰ = \boxed{\frac{\sqrt{۳}}{۳}}$

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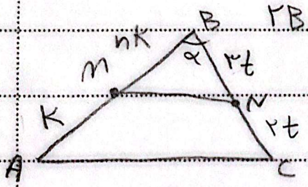

$۲BN = ۳NC \longrightarrow BN = \frac{۳}{۲} NC \longrightarrow ۳t = BN$ ($NC = ۲t$)

$\hat{A}BC = ۳B\hat{M}N \longrightarrow ۵t \times \frac{۱}{۲} \times \sin\alpha \times (n+۱)k = ۳ \times \frac{۱}{۲} \times \sin\alpha \times nk \times ۳t$

$۵k + ۵nk = ۹nk$

$۵k = ۴nk \longrightarrow n = \frac{۵k}{۴k}$

$\frac{BM}{AM} = \frac{nk}{k} = \boxed{n = \frac{۵}{۴}}$

۱۰

$\frac{۱}{\sqrt{\cos^۲\alpha}} - \tan\alpha = \frac{۱+\sin\alpha}{|\cos\alpha|} \longrightarrow \frac{۱}{|\cos\alpha|} + \frac{-۱-\sin\alpha}{|\cos\alpha|} = \frac{\sin\alpha}{\cos\alpha} \Rightarrow -\cos\alpha = |\cos\alpha|$

$\cos\alpha < ۰$

$\frac{|\sin\alpha|}{\cos\alpha} = -\frac{۱}{\cot\alpha} \longrightarrow \frac{|\sin\alpha|}{\cos\alpha} = \frac{-\sin\alpha}{\cos\alpha} \Rightarrow |\sin\alpha| = -\sin\alpha \Rightarrow \sin\alpha < ۰$

ناصحیح