فرهام علیدوست تکلیف 18

الف) $\underbrace{\tan\frac{11\pi}{4}}_{135}+\underbrace{\sin\frac{15\pi}{4}}_{315}\underbrace{\cos\frac{13\pi}{4}}_{225}=-1+-\frac{\sqrt2}{2}\times-\frac{\sqrt2}{2}=-1+\frac{1}{2}=\boxed{-\frac{1}{2}}$ -1

ب) $\underbrace{\tan\frac{17\pi}{6}}_{150}\underbrace{\sin\frac{11\pi}{3}}_{300}+\underbrace{\cos\frac{10\pi}{3}}_{240}=-\frac{\sqrt3}{3}\times-\frac{\sqrt3}{2}-\frac{1}{2}=\frac{\cancel{3}}{\underset{\frac{1}{2}}{6_1}}-\frac{1}{2}=0$

$\cot x=4\Rightarrow\frac{\cos x}{\sin x}=\frac{4}{1}\Rightarrow\cos x=4,\ \sin x=1\quad\frac{3\times4-1}{4+1}=\boxed{\frac{11}{5}}$ -2

$\sin\alpha=2\cos\alpha$  $\Rightarrow\sin,\cos<0\quad\tan=\frac{\sin}{\cos}\Rightarrow\frac{2\cos}{\cos}=2$ -3

$\tan^2+1=\frac{1}{\cos^2}\Rightarrow4+1=\frac{1}{\frac{1}{5}}\Rightarrow\cos^2=\frac{1}{5}\Rightarrow$ ربع سوم $\Rightarrow\cos=-\frac{1}{\sqrt5}$

$\cos(\frac{11\pi}{4}+\alpha)=\cos(\frac{3\pi}{4}+\alpha)\quad\sin^2+\cos^2=1\Rightarrow\frac{2}{100}+\cos^2=1\Rightarrow\cos^2=\frac{80}{100}\Rightarrow\cos=\frac{\sqrt{80}}{10}$ (الف) -4

$\sin\frac{3\pi}{4}=\frac{\sqrt2}{2},\ \cos\frac{3\pi}{4}=-\frac{\sqrt2}{2}\quad\cos(\alpha+\beta)=(\cos\alpha\cdot\cos\beta)-(\sin\alpha\cdot\sin\beta)=(\frac{\sqrt{80}}{10}\times\frac{\sqrt2}{2})=(\frac{\sqrt2}{10}\times\frac{\sqrt2}{2})\Rightarrow$

$\frac{4\sqrt{10}}{20}-\frac{1}{10}=\frac{2\sqrt{10}}{10}-\frac{1}{10}=\frac{2\sqrt{10}-1}{10}$

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$\sin(\frac{13\pi}{4}+\alpha)=\sin(\frac{5\pi}{4}+\alpha)\quad1+\tan^2\alpha=\frac{1}{\cos^2\alpha}\Rightarrow1+\frac{1}{49}=\frac{1}{\cos^2}\Rightarrow\cos^2\alpha=\frac{49}{50}\Rightarrow\cos\alpha=\frac{7}{\sqrt{50}}$ (ب

$\sin\alpha=\frac{1}{\sqrt{50}}$

$\sin\frac{5\pi}{4}=-\frac{\sqrt2}{2},\ \cos\frac{5\pi}{4}=-\frac{\sqrt2}{2}\quad\sin(\alpha+\beta)=\sin\alpha\cos\beta+\sin\beta\cos\alpha=(\frac{1}{\sqrt{50}}\times-\frac{\sqrt2}{2})+(-\frac{\sqrt2}{2}\times\frac{7}{\sqrt{50}})\Rightarrow$

$=\frac{\sqrt2}{2\sqrt{50}}+(-\frac{7\sqrt2}{2\sqrt{50}})\Rightarrow-\frac{8\sqrt2}{2\sqrt{50}}=\frac{-4\sqrt2}{\sqrt{50}}\times\frac{\sqrt{50}}{\sqrt{50}}=\frac{4\sqrt{100}}{50}=\frac{4\times10}{50}=\frac{4}{5}$

$\sin^2x+\cos^2x=1,\ 2\sin^2x+\cos^2x=\frac{4}{3}\Rightarrow\sin^2x=\frac{1}{3},\ \cos^2x=\frac{2}{3}$

$\tan^2x+1=\frac{1}{\cos^2x}\Rightarrow\tan^2x+1=\frac{3}{2}\Rightarrow\boxed{\tan^2x=\frac{1}{2}}$ -5

$\frac{1}{2}\times\sqrt3\times\underset{3}{\cancel{6}}\times\sin\alpha=4{,}5\Rightarrow3\sqrt3\times\sin\alpha=4{,}5\Rightarrow\sin\alpha=\frac{4{,}5}{3\sqrt3}=\frac{1{,}5}{\sqrt3}=\frac{1{,}5\sqrt3}{3}=\frac{\sqrt3}{2}$ -6

$\sin\alpha=\frac{\sqrt3}{2}=\frac{\pi}{3}\Rightarrow\min\alpha=\frac{\pi}{3},\ \max\alpha=\frac{2\pi}{3}\Rightarrow\frac{\max}{\min}=\frac{\frac{2\pi}{3}}{\frac{\pi}{3}}=2$

چون مکمل هستند زاویه بیشتر از 180 نمی‌شود

متوازی الاضلاع $S=a\cdot b\cdot\sin\alpha=54\Rightarrow2k\times3k\times\underbrace{\sin150}_{\frac{1}{2}}=54\Rightarrow6k^2\times\frac{1}{2}=54\Rightarrow3k^2=54$ -7

$\Rightarrow k^2=18\Rightarrow k=3\sqrt2\Rightarrow2k=6\sqrt2,\ 3k=9\sqrt2\Rightarrow$ محیط $=2(a+b)\Rightarrow$

$2(6\sqrt2+9\sqrt2)=2(15\sqrt2)=\boxed{30\sqrt2}$

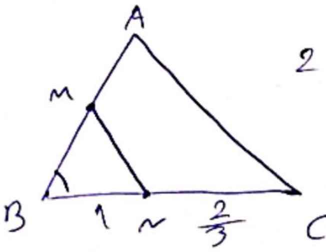
$S_{A\hat{B}C}-S_{A\hat{D}E}=1{,}75\Rightarrow(\frac{1}{2}\times5\times7\times\sin\alpha)-(\frac{1}{2}\times4\times7\times\sin\alpha)=1{,}75\Rightarrow$

$\frac{\sin\alpha}{2}(5\times7-4\times7)=1{,}75\Rightarrow\sin\alpha=\frac{\frac{175}{100}}{\frac{7}{2}}=\frac{25}{50}=\frac{1}{2}\Rightarrow\alpha=30\Rightarrow\cos\alpha=\frac{\sqrt3}{2}$ -8

$\tan\alpha=\frac{\sin\alpha}{\cos\alpha}=\frac{\frac{1}{2}}{\frac{\sqrt3}{2}}=\frac{\sqrt3}{3}$

Scanned with CamScanner

-9)



$$2\overline{BN} = 3\overline{NC} \Rightarrow \overline{BN} = \frac{3\overline{NC}}{2} \Rightarrow 1 = \frac{3}{2} \times \boxed{\frac{2}{3}} \to NC \to$$

نسبت ها یکی که دو کسر می سازد در نظر گرفته شده

$$S_{\overset{\triangle}{ABC}} = 3(S_{\overset{\triangle}{BNM}}) \Rightarrow \cancel{\tfrac{1}{2}} \times \underset{\frac{5}{3}}{BC} \times AB \times \cancel{\sin B} = 3(\cancel{\tfrac{1}{2}} \times \overset{1}{BN} \times BM \times \cancel{\sin B})$$

$$\Rightarrow AB \times 5 = 9(BN \times BM) \Rightarrow AB = \frac{9(\overset{1}{BN} \times BM)}{5}$$

$$\Rightarrow BM + AM = \frac{9}{5} BM \Rightarrow \frac{BM + AM}{BM} = \frac{9}{5} \Rightarrow \underset{1}{\frac{BM}{BM}} + \frac{AM}{BM} = \frac{9}{5} \Rightarrow \frac{AM}{BM} = \frac{4}{5} \Rightarrow \boxed{\frac{BM}{AM} = \frac{5}{4}}$$

-10)

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

$$\Rightarrow \sqrt{\cos^2\alpha} = |\cos\alpha| , -\frac{1}{\cot\alpha} = -\tan\alpha \Rightarrow ② \frac{|\sin\alpha|}{\cos\alpha} = -\tan\alpha = -\frac{\sin\alpha}{\cos\alpha}$$

$\Rightarrow |\sin\alpha| = -\sin\alpha \Rightarrow$ وقتی برقرار است که $\sin\alpha \leq 0$ باشد $\quad ① \tan\alpha - \frac{1}{|\cos\alpha|} = \frac{\sin\alpha + 1}{|\cos\alpha|}$

$\Rightarrow \tan\alpha - \frac{\sin\alpha \cancel{+1-1}}{|\cos\alpha|} = 0 \Rightarrow \tan\alpha = \frac{\sin\alpha}{|\cos\alpha|} \Rightarrow \frac{\sin\alpha}{\cos\alpha} = \frac{\sin\alpha}{|\cos\alpha|} \Rightarrow -\cos\alpha = |\cos\alpha| \Rightarrow$ درصورتی درست است که $\cos\alpha \leq 0$ باشد

$\Rightarrow \sin\alpha , \cos\alpha \neq 0 \Rightarrow$ تعریف نشده cot, tan چون $\Rightarrow \sin\alpha , \cos\alpha < 0 \Rightarrow$ در ربع سوم