ن.ب

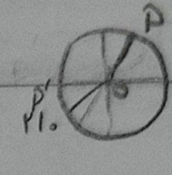
نازل قنبری — تکلیف ۱۲ — ۱۴۰۴/۸/۵

۱_ $\dfrac{a\times\frac{-\sqrt{3}}{2}+b\,\frac{-\sqrt{3}}{2}}{a\times\frac{-1}{2}+b\,\frac{1}{2}}=-\dfrac{\sqrt{3}}{3}\Rightarrow\left(\dfrac{-\sqrt{3}a}{2}+\dfrac{-\sqrt{3}b}{2}\right)\overset{3}{=}\dfrac{a\sqrt{3}}{4}-\dfrac{b\sqrt{3}}{4}$

$\Rightarrow\dfrac{-3\sqrt{3}a}{4}+\dfrac{-3\sqrt{3}b}{4}=\dfrac{a\sqrt{3}}{4}-b\dfrac{\sqrt{3}}{4}$

$\Rightarrow\dfrac{-3\sqrt{3}a}{4}-\dfrac{a\sqrt{3}}{4}=\dfrac{-b\sqrt{3}}{4}+\dfrac{3\sqrt{3}b}{1}\Rightarrow -2a=b\rightarrow\dfrac{b}{a}=-2$

۲_ $P\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)=60^\circ\xrightarrow{210^\circ\text{ در خلاف}}P'=210^\circ$



محیط $OPP'=\overline{PO}+\overline{P'O}+\overline{PP'}=1+1+1=3$

$\overline{PP'}=2R\sin\alpha=2\times1\times\sin150^\circ=1$

۳_ $\dfrac{\pi}{4}\,\Big|\,1h$

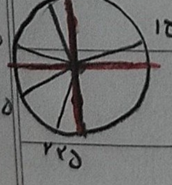
$\dfrac{17\pi}{9}\,\Big|\,?h$ $?h=\frac{4}{3}h=40\,min\rightarrow$ ۲ و ۴۰

۴_ $\theta=\left|\dfrac{11M}{2}-30H\right|\Rightarrow20=\left|\dfrac{11M}{2}-90\right|\Rightarrow\begin{cases}20=\dfrac{11M}{2}-90\Rightarrow M=20\\ -20=\dfrac{11M}{2}-90\\ \Rightarrow M=\dfrac{140}{11}\simeq12.7\end{cases}$

۵_ $-1<\sin x\leq\frac{1}{2}\rightarrow-1<\dfrac{m-4}{5}<\dfrac{1}{2}$

$\Rightarrow-1<m<6.5\rightarrow$ ۸ عدد صحیح

۶_



$\dfrac{+\cos15^\circ-k\sin15^\circ}{-\cos15^\circ-2\sin15^\circ}=3\xrightarrow[\substack{\sin=5\\ \cos=45}]{\tan=\frac{1}{4}}\dfrac{4-k}{-4-2}=-3$

$4-k=-18\Rightarrow k=22$

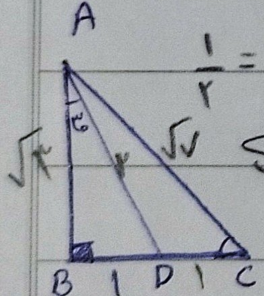
$\frac{۲\sin^{۲}\frac{x}{۲}}{۲\cos^{۲}\frac{x}{۲}} = \tan^{۲}\frac{x}{۲} = ۲ \Rightarrow \tan x = \frac{۲\tan\frac{x}{۲}}{۱-\tan^{۲}\frac{x}{۲}} = \frac{-۲\sqrt{۲}}{-۱}$ —۷

$\Rightarrow \frac{+\cot x + \cot x}{+\tan x - ۲\tan x} = \frac{۲\cot x}{-\tan x} = -۲\cot^{۲}x = -۲ \times \frac{۱}{\tan^{۲}x}$

$\Rightarrow \tan^{۲}x = ۸ \leadsto -۲\cot^{۲}x = \frac{-۲}{۸} = -\frac{۱}{٤}$

$L = \theta r \Rightarrow \frac{۱۰۸\pi}{۱۸۰} \times r_A = \frac{۹\pi}{۱۰} \times r_B \Rightarrow \frac{r_A}{r_B} = \frac{\frac{۹\pi}{۱۰}}{\frac{۳\pi}{۵}}$ —۸

$\Rightarrow \frac{r_A}{r_B} = \frac{۳}{۲} \xrightarrow{۲} \frac{S_A}{S_B} = \frac{۹}{۴}$

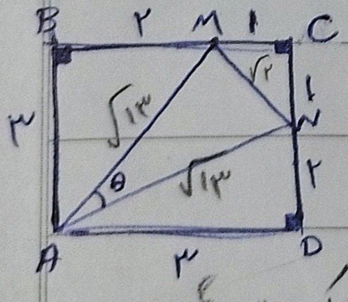


$\frac{۱}{۲} = \sin ۳۰ = \frac{BD}{AD} \Rightarrow AD = ۲ ,\ AB = \sqrt{۴-۱} = \sqrt{۳}$ —۹

$S_{ABC} = \frac{AB \times BC}{۲} = \sqrt{۳} \Rightarrow BC = ۲ \Rightarrow DC = ۱$

$\sin\hat{C} = \frac{\sqrt{۳}}{\sqrt{۷}} ,\ \cos\hat{C} = \frac{۲}{\sqrt{۷}} \Rightarrow \sin ۲\hat{C} = ۲\sin\hat{C}\cos\hat{C}$

$= ۲ \times \frac{\sqrt{۳}}{\sqrt{۷}} \times \frac{۲}{\sqrt{۷}} = \frac{۴\sqrt{۳}}{۷}$



$AM = AN ,\ BM^{۲} + BA^{۲} = AM^{۲} = AN^{۲}$ —۱۰

$\Rightarrow \sqrt{۴+۹} = \sqrt{۱۳} = AM = AN$

$\Rightarrow$ ق کسینوس $= MN^{۲} = AM^{۲} + AN^{۲} - ۲AM.AN.\cos\theta$

$\Rightarrow ۲ = ۱۳ + ۱۳ - ۲ \times ۱۳ \times \cos\theta \Rightarrow ۲۶\cos\theta = ۲٤ \Rightarrow \cos\theta = \frac{۱۲}{۱۳}$

$۲۶ - ۲۶\cos\theta$

$\Rightarrow \sin\theta = \frac{۵}{۱۳}$