مهسا موسوی   تکلیف شماره ۱۲   دوازدهم دختر A

(۱

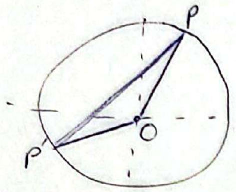
$$\frac{a\sin(\pi+\frac{\pi}{۳})+b\cos(\pi+\frac{\pi}{۶})}{a\sin(\frac{۳\pi}{۲}+\frac{\pi}{۳})+b\cos(\frac{\pi}{۳})}=\frac{-a\sin\frac{\pi}{۳}-b\cos\frac{\pi}{۶}}{(b-a)\cos\frac{\pi}{۳}}=-\tan\frac{\pi}{۶}\rightarrow$$

$$\frac{-a\cos\frac{\pi}{۶}-b\cos\frac{\pi}{۶}}{(b-a)\sin\frac{\pi}{۶}}=\frac{a+b}{a-b}\cot\frac{\pi}{۶}=-\tan\frac{\pi}{۶}\rightarrow\frac{a+b}{a-b}=\frac{-\tan\frac{\pi}{۶}}{\cot\frac{\pi}{۶}}=-\frac{۱}{۳}\rightarrow$$

$$۳a+۳b=b-a\longrightarrow ۲a=-۲b\longrightarrow\frac{b}{a}=-۱$$

(۲

$$\cos P=\frac{۱}{۲}\rightarrow P=\frac{\pi}{۳}\qquad OP=OP'=۱\quad,\ P(\frac{۱}{۲},\frac{\sqrt{۳}}{۲})\ ,\ P'(-\frac{\sqrt{۳}}{۲},-\frac{۱}{۲})$$



$$PP'=\sqrt{(\frac{\sqrt{۳}+۱}{۲})^۲+(\frac{\sqrt{۳}+۱}{۲})^۲}=\sqrt{\frac{(\sqrt{۳}+۱)^۲}{۲}}=\frac{\sqrt{۳}+۱}{\sqrt{۲}}=\frac{\sqrt{۶}+\sqrt{۲}}{۲}$$

$$\text{محیط}=۲+\frac{\sqrt{۶}+\sqrt{۲}}{۲}$$

(۳

$$\frac{\frac{\pi}{۶}}{\frac{\pi}{۹}}=\frac{۶۰\text{min}}{?}\longrightarrow ?=\frac{\frac{\pi}{۹}\times۶۰}{\frac{\pi}{۶}}=۴۰\text{ min}\longrightarrow ۲:۴۰$$

(۴

$$\theta=|۵٫۵M-۳۰h|\longrightarrow ۲۰=|۵٫۵M-۹۰|\rightarrow ۵٫۵M-۹۰=-۲۰\rightarrow ۵٫۵M=۷۰\rightarrow M=۱۲٫\ldots$$

بار اول

$$\rightarrow ۵٫۵M-۹۰=۲۰\rightarrow ۵٫۵M=۱۱۰\rightarrow M=۲۰$$

بار دوم ← بعد از ۲۰ دقیقه

(۵

$$-\frac{۱}{۲}<\sin x\leqslant ۱\longrightarrow -\frac{۱}{۲}<\frac{m-۳}{۵}\leqslant ۱\longrightarrow -\frac{۵}{۲}<m-۳\leqslant ۵\longrightarrow\frac{۱}{۲}<m\leqslant ۸$$

شامل ۸ عدد صحیح

(۶

$$\frac{\sin(۹۰+۱۵)+k\cos(۲۷۰-۱۵)}{\cos(۱۸۰-۱۵)+۲\sin(۱۸۰+۱۵)}=\frac{\cos۱۵-k\sin۱۵}{-\cos۱۵-۲\sin۱۵}=\frac{۴-k}{-۴-۲}=\frac{k-۴}{۶}=۳\rightarrow$$

$$k=۲۲$$

$$\tan x=\frac{۱}{۴}\longrightarrow\frac{\sin x}{\cos x}=\frac{۱}{۴}\longrightarrow$$

می‌توان فرض کرد

$\sin=۱$ و $\cos=۴$

(۷

$$\frac{\tan(\frac{\pi}{۲}-x)-\cot(\pi-x)}{\cot(\frac{۳\pi}{۲}-x)+۲\tan(۲\pi-x)}=\frac{\cot x+\cot x}{\tan x-۲\tan x}=\frac{۲\cot x}{-\tan x}=-۲\frac{\cos^۲x}{\sin^۲x}=$$

$$-۲\times\frac{\frac{۱}{۹}}{\frac{۸}{۹}}=-\frac{۱}{۴}$$

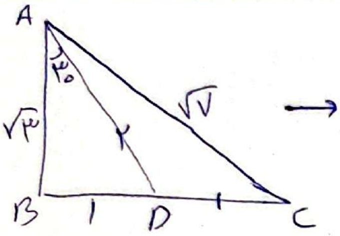
$$*\quad ۱-\cos x=۲+۲\cos x\rightarrow\cos x=-\frac{۱}{۳}\longrightarrow\sin x=\frac{\sqrt{۸}}{۳}$$

(۸

$$\frac{۱۰۸}{۳۶۰} = \frac{x}{۲\pi} \rightarrow x = \frac{۳\pi}{۵}$$

$$\frac{۳\pi}{۵} \times R_A = R_B \times \frac{۹\pi}{۱۰} \longrightarrow \frac{R_A}{R_B} = \frac{۳}{۲} \longrightarrow \frac{P_A}{P_B} = \frac{۹}{۴}$$

(۹

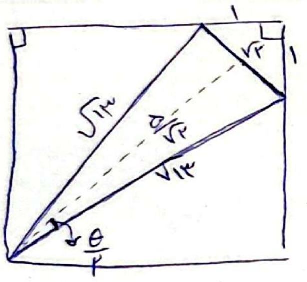


$$\sin ۳۰ = \frac{۱}{۲} = \frac{BD}{AD} \rightarrow AD = ۲$$

$$\longrightarrow \sin \hat{C} = \frac{\sqrt{۳}}{\sqrt{۷}} \longrightarrow \sin ۲\alpha = ۲\sin\alpha\cos\alpha \longrightarrow \cos \hat{C} = \frac{۲}{\sqrt{۷}} = \frac{۲\sqrt{۷}}{۷}$$

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

(۱۰



$$\sin \frac{\theta}{۲} = \frac{\frac{\sqrt{۲}}{۲}}{\sqrt{۱۳}} = \frac{\sqrt{۲}}{۲\sqrt{۱۳}} \quad , \quad \cos \frac{\theta}{۲} = \frac{\frac{۵}{\sqrt{۲}}}{\sqrt{۱۳}} = \frac{۵}{\sqrt{۲۶}}$$

$$\sin\theta = ۲\sin\frac{\theta}{۲}\cos\frac{\theta}{۲} \rightarrow \sin\theta = \cancel{۲} \times \frac{\cancel{\sqrt{۲}}}{\cancel{۲}\sqrt{۱۳}} \times \frac{۵}{\cancel{\sqrt{۲}} \times \sqrt{۱۳}} = \frac{۵}{۱۳}$$