الیسا خان محمدی

(۱)

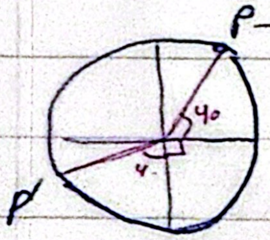
$$\frac{a\sin\frac{4\pi}{3} + b\cos\frac{7\pi}{6}}{a\sin\frac{11\pi}{6} + b\cos\frac{\pi}{3}} = \tan\frac{5\pi}{6}$$

$\sin\frac{4\pi}{3} = -\frac{\sqrt{3}}{2}$, $\cos\frac{7\pi}{6} = -\frac{\sqrt{3}}{2}$, $\tan\frac{5\pi}{6} = -\frac{\sqrt{3}}{3}$, $\sin\frac{11\pi}{6} = -\frac{1}{2}$, $\cos\frac{\pi}{3} = \frac{1}{2}$

$$\frac{-\frac{\sqrt{3}}{2}(a+b)}{-\frac{1}{2}(a-b)} = -\frac{\sqrt{3}}{3} \Rightarrow b-a = 3a+3b$$

$$-2b = 4a \qquad \frac{b}{a} = -2$$

(۲)



$P \rightarrow (\frac{1}{2}, y)$ cos

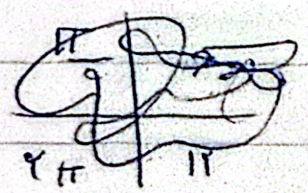
$\text{کل} = 1 + 1 + \frac{7\pi}{6} = 2 + \frac{7\pi}{6}$

$PP' = 2r \qquad \frac{7\pi}{6}\,\alpha_1$

210

$$210 \times \frac{\pi}{180} = \frac{35\pi}{30} = \frac{7\pi}{6}$$

(۳)



$\text{کل } 2\pi \longrightarrow \div 12 = \frac{\pi}{6}$

$\frac{\pi}{6} \div \frac{\pi}{9} = \frac{3}{2}$ ۱ و نیم ساعت ۲ میره جلو $\Rightarrow$ ۳:۳۰

(۴)

$$\alpha = \left|\frac{11m}{2} - 30H\right| \Rightarrow 20 = \left|\frac{11m}{2} - 2\times 30\right|$$

$\frac{11m}{2} = 110 \Rightarrow m = 20$ ✓ مراز ۲۰ دقیقه

$\frac{11m}{2} = 70 \Rightarrow m = 12/7$

(۵)

$\frac{-\pi}{6} < x < \frac{5\pi}{6}$

$\max \sin = 1$

$\min \sin = -\frac{1}{2}$

$\frac{m-3}{5} = 1 \qquad m-3=5 \qquad \underline{\underline{m=8}} \qquad \frac{1}{2} < m \leq 8$

$\frac{m-3}{5} = -\frac{1}{2} \Rightarrow 2m-6=-5 \qquad 2m=1 \qquad m=\frac{1}{2}$

---

(۶)

$\frac{\sin(\overset{90+15}{105}) + K\cos(\overset{270-15}{255})}{\cos(\underset{180-15}{165}) + 2\sin(\underset{180+15}{195})} = 3 \qquad \frac{1}{4} = \frac{\sin}{\cos} = \tan 15 = \frac{1}{4}$

$\frac{\overset{4}{\cancel{\cos 15}} + (-K\overset{1}{\cancel{\sin 15}})}{-\underset{4}{\cancel{\cos 15}} - 2\underset{1}{\cancel{\sin 15}}} = \frac{4-K}{-4-2} = 3 \qquad 4-K=-18 \qquad K=22$

---

(۷)

$\frac{\tan(\frac{\pi}{2}-x) - \cot(\pi-x)}{\cot(\frac{3\pi}{2}-x) + 2\tan(3\pi-x)} \Rightarrow \frac{+\cot x + \cot x}{\tan x - 2\tan x} = \frac{2\cot x}{-\tan x}$

$\frac{-2\cos^2 x}{\sin^2 x} = \frac{-2\times\frac{1}{9}}{\frac{8}{9}} = -\frac{1}{4}$

$\frac{1-\cos x}{1+\cos x} = 2 \Rightarrow 2+2\cos x = 1-\cos x \qquad \cos x = -\frac{1}{3}$

$\sin^2 x + \cos^2 x = 1 \qquad 1-\frac{1}{9} = \frac{8}{9} = \sin^2 x$

(8)

$\frac{108 \times \pi}{180} = \frac{3\pi}{5}$

$L = \frac{3\pi}{5} \times 2\pi R$

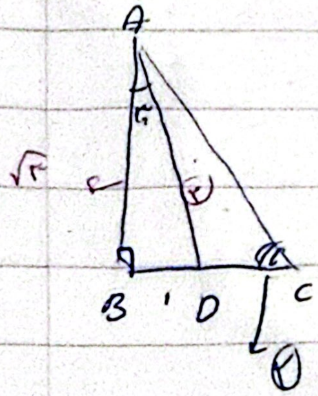
$\frac{3\pi}{5} R = \frac{9\pi}{10} R'$

$2R = 3R'$

$L = \alpha R = \frac{9\pi}{10} \times R'$

$\frac{S_A}{S_B} = \frac{9x^2}{4x^2} = 9/4$

(9)



$AD = 2 \times 1 = 2$

$AB = \frac{\sqrt{3}}{2} \times 2 \Rightarrow \sqrt{3}$

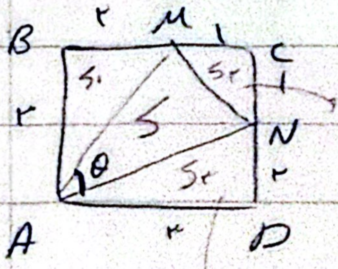
$S_D = \frac{\sqrt{3} \times DC}{2} = \sqrt{3} \Rightarrow DC = 2$

$AC = 2\sqrt{3}$

$\sin C = \frac{\sqrt{3}}{2\sqrt{3}} = \frac{1}{2} \Rightarrow \cos C = \frac{3}{2\sqrt{3}}$

$\sin 2C = 2\sin C \cos C = 2 \times \frac{3}{2\sqrt{3}} \times \frac{1}{2} = \frac{3}{2\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{2}$

(10)



$S_\square = S + S_1 + S_2 + S_3$

$\frac{1 \times 2}{2} = 1$

$S_\square = 9 = S + 3 + 3 + 1$

3×3

$S_{AMN} = 2$

$\frac{2 \times 3}{2} = 3$

$S = AM^2 \times \frac{1}{2} \times \sin\theta = 13 \times \frac{1}{2} \times \sin\theta = 2$

$\sqrt{4 + 9} = \sqrt{13}$

$\frac{4}{13}$