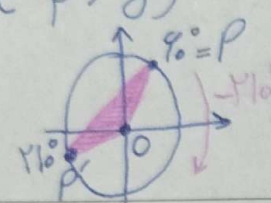


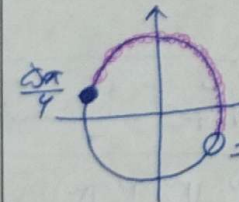
$$\frac{a \sin \frac{\pi}{3} + b \cos \frac{\pi}{4}}{a \sin \frac{\pi}{4} + b \cos \frac{\pi}{3}} = \tan \frac{\pi}{4} \rightarrow \left(\frac{1-\sqrt{3}}{2}\right)b = \left(\frac{\sqrt{3}+1}{2}\right)a$$

خوابه سوال: $\frac{b}{a} = \frac{\frac{1+\sqrt{3}}{2}}{\frac{1-\sqrt{3}}{2}} = \frac{\sqrt{3}+1}{-\sqrt{3}+1} = -2-\sqrt{3}$

$P(\cos \alpha, \sin \alpha) \rightarrow \cos \alpha = \frac{1}{2} \rightarrow \alpha = 90^\circ$ نقطه
 $P(\frac{1}{2}, y)$

 $P(\cos 90, \sin 90) \rightarrow P(\frac{1}{2}, \frac{\sqrt{3}}{2})$
 $P'(\cos 210, \sin 210) \rightarrow P'(-\frac{\sqrt{3}}{2}, \frac{1}{2})$
 $PP' = \sqrt{(\frac{1}{2} + \frac{\sqrt{3}}{2})^2 + (\frac{\sqrt{3}}{2} - \frac{1}{2})^2} = \sqrt{\sqrt{3}+2}$ $P_{opp} = 2 + \sqrt{\sqrt{3}+2}$

$\frac{\theta_{min}}{\pi} = \frac{\frac{\pi}{4} \text{ ساعت}}{\frac{\pi}{4} \text{ ساعت}} \rightarrow \alpha = 60 \rightarrow$ ساعت جدید: ۲:۰۰'

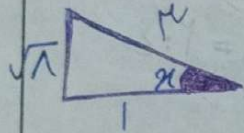
از فرمول $\alpha = \left| \frac{11M}{2} - 90H \right| \rightarrow \alpha_0 = \left| \frac{11M}{2} - 90 \right|$
 پس بزرگ‌ترین ۲۰ دقیقه زاویه بین عقربه ساعت شمار و درجه شمار برای بار دوم ۲۰ می‌شود. بار اول $M = 12$ بار دوم $M = 12$
 $\begin{cases} \frac{11M}{2} - 90 = 20 \rightarrow M = 20 \text{ min} \text{ بار دوم} \\ \frac{11M}{2} - 90 = -20 \rightarrow M = 12 \end{cases}$


 $-\frac{\pi}{4} < \alpha \leq \frac{\pi}{4} \rightarrow -\frac{1}{2} < \sin \alpha \leq 1$
 $-\frac{1}{2} < \frac{m-3}{5} \leq 1 \rightarrow -\frac{5}{2} < m-3 \leq 5$
 $\frac{1}{2} < m \leq 1$

$$\frac{\sin(90+15) + K \cos(170-15)}{\cos(170-15) + 2 \sin(170+15)} = 2 \rightarrow \frac{\cos(15) - K \sin(15)}{-\cos(15) - 2 \sin(15)} = 2$$

$$\div \cos(15) \rightarrow \frac{1 - K \tan(15)}{-1 - 2 \tan(15)} = 2 \rightarrow 1 - \frac{K}{2} = -1 - \frac{1}{2} \rightarrow K = 10$$

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

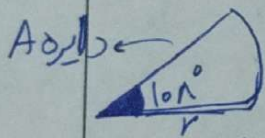


$$\tan x = \frac{-\sqrt{10}}{1}$$

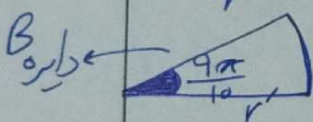
$$\cot x = \frac{-1}{\sqrt{10}}$$

چون ناحیه دوم است $\cot \angle / \tan \angle / \cos \angle$

$$\frac{2 \cot(x)}{-\tan(x)} \rightarrow \frac{\frac{-2}{\sqrt{10}}}{\frac{-1}{\sqrt{10}}} = \frac{-2}{-1} = 2$$

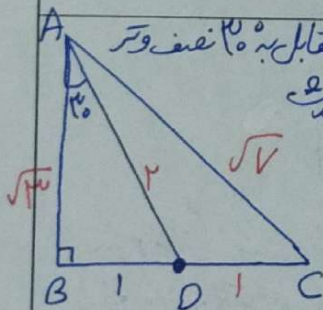


$$x \rightarrow x = (10 \times \frac{\pi}{180}) r \rightarrow \frac{2\pi}{9} r = \frac{9\pi}{10} r' \rightarrow r = \frac{9}{2} r'$$



$$x \rightarrow x = \frac{9\pi}{10} r'$$

$$\frac{S_A}{S_B} = \frac{\pi r^2}{\pi r'^2} = \frac{9}{2} \frac{r'^2}{r'^2} = \frac{9}{2}$$



خط عمود 20 درجه $\rightarrow AD = 2$

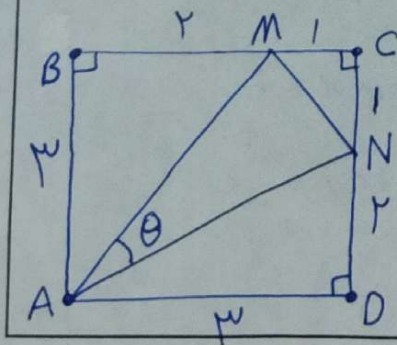
با فیثاغورس $\rightarrow AB = \sqrt{3}$

$$S_{ABC} = \sqrt{3} = \frac{\sqrt{3} \times (1+1)}{2} \rightarrow DC = 1$$

بنابر این خط AD میانه است $\rightarrow$ پس زاویه A می شود 90

و زاویه C می شود 20

$$\sin 2(20) = \sin 40 = \sin A \rightarrow \sin A = \frac{2}{\sqrt{5}}$$



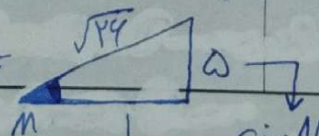
$$AM = AN = \sqrt{13} / MN = \sqrt{2}$$



$$a = \sqrt{b^2 + c^2 - 2bc \cos A}$$

$$\sqrt{13} = \sqrt{2 + 13 - 2(\sqrt{2}) \cos M}$$

$$\cos M = \frac{1}{\sqrt{2}}$$



$$\sin M = \frac{1}{\sqrt{2}}$$

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{\sqrt{2}}{\sin \theta} = \frac{\sqrt{13}}{\sin M} \rightarrow \frac{\sqrt{2}}{\sin \theta} = \frac{13\sqrt{2}}{1} \rightarrow \sin \theta = \frac{1}{13}$$