

کتاب حساب / دایره و دایره

حل

تاریخ ۱۲

$$\frac{a \sin \frac{24}{15} + b \cos \frac{11}{4}}{a \sin \frac{11}{4} + b \cos \frac{24}{15}} = \tan \frac{18}{4} \Rightarrow \frac{ax - \frac{\sqrt{2}}{2} + bx - \frac{\sqrt{2}}{2}}{ax - \frac{1}{2} + bx + \frac{1}{2}} = -\frac{\sqrt{2}}{2} \quad (1)$$

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

$$\begin{cases} a+b = -x \\ a-b = +x \end{cases} \Rightarrow 2a = 2x \rightarrow a = x \text{ و } b = -2x \rightarrow \frac{b}{a} = -2$$

$$P = \left(\frac{1}{2}, y\right) \rightarrow 4^\circ \text{؟ است؟} \rightarrow P = \left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right) \quad (2)$$

$$\rightarrow 40 - 210 = -170 \rightarrow -170 + 360 = +190 = P' \text{ زاویه}$$

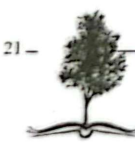
$$\alpha = 30 + 90 + 70 = 190^\circ, B = 110 - 100 = 10^\circ$$

$$\sin \alpha = \frac{1 - \cos 2\alpha}{2} \rightarrow \sin 10^\circ = \frac{1 - \frac{\sqrt{3}}{2}}{2}$$

$$\rightarrow \sin 10^\circ = \frac{2 - \sqrt{3}}{4}$$

$$\frac{a}{\sin 10} = \frac{b}{\sin 10} = \frac{c}{\sin 100} \rightarrow \frac{1}{\frac{2 - \sqrt{3}}{4}} = \frac{c}{\frac{1}{2}}$$

$$c = \sqrt{4 - \sqrt{3}} \rightarrow P = 2 + \sqrt{4 - \sqrt{3}} \quad ??$$



Senobar

$$\frac{H}{A} = \frac{r_0}{110} \rightarrow \alpha = r_0 \rightarrow \text{بین مرکزی } 60^\circ \text{ ماکت } (4)$$

$$\text{تعداد } = 40 \text{ min} = 12 \text{ ساعت } 20 \rightarrow 12 \text{ ساعت } \times 2 = \text{min } 24$$

$$\Rightarrow r_0 \times 2 = 80 \text{ min} \rightarrow r + 80 \text{ min} = \boxed{r: 20} \rightarrow ?$$

$$\alpha = \left| \frac{1}{r} M - r_0 H \right| \Rightarrow \begin{cases} \omega / \omega M - 90 = r_0 \rightarrow \frac{1}{r} M = 110 \\ \omega / \omega M - 90 = -r_0 \rightarrow \frac{1}{r} M = 70 \end{cases} (5)$$

$$\rightarrow \begin{cases} M = r_0 \\ M = \frac{120}{11} \end{cases} \Rightarrow r_0 > \frac{120}{11} \rightarrow \begin{cases} 10 \text{ min} \rightarrow \text{بزرگ} \rightarrow 2 \\ \frac{120}{11} \text{ min} \rightarrow \text{دایره} \end{cases}$$

$$-\frac{H}{r} < \alpha \leq \frac{\omega H}{r} \rightarrow \text{Diagram of a circle with angles} \rightarrow -\frac{1}{r} < \sin \alpha \leq 1 (6)$$

$$\sin = \frac{M-r}{a} \rightarrow -\frac{1}{r} < \frac{M-r}{a} \leq 1 \xrightarrow{\omega} -\frac{a}{r} < M-r \leq a \xrightarrow{+r}$$

$$\left(\frac{1}{r} < M \leq a \right) \rightarrow ?$$

$$\frac{\sin(10^\circ) + K \cos(70^\circ)}{\cos(70^\circ) + r \sin(10^\circ)} = r \xrightarrow{\alpha=10^\circ} \frac{\sin(\frac{H}{r} + \alpha) + K \cos(\frac{H}{r} - \alpha)}{\cos(H - \alpha) + r \sin(H + \alpha)} (7)$$

$$\frac{+ \cos \alpha - K \sin \alpha}{- \cos \alpha - r \sin \alpha} = r \xrightarrow{\div \cos \alpha} \frac{1 - K \tan \alpha}{-1 - r \tan \alpha} = r$$

$$\tan \alpha = 2, 70 \rightarrow \frac{1 - \frac{K}{r}}{-1 - \frac{1}{r}} = r \rightarrow 1 - \frac{K}{r} = r \times \frac{-r}{1} = -\frac{r}{1}$$

$$-\frac{K}{r} = -\frac{1}{r} \rightarrow K = 1 + r \rightarrow ?$$

Senobar 

$$\frac{\tan\left(\frac{\mu}{r} - x\right) - \cot(\mu - x)}{\cot\left(\frac{\mu}{r} - x\right) - r \tan(\mu - x)} = \frac{+\cot x + \cot x}{+\tan \mu + r \tan \mu} = \frac{r \cot x}{r \tan x} \quad (v)$$

$$\frac{1 - \cos \mu}{1 + \cos \mu} = r \rightarrow 1 - \cos \mu = r + r \cos \mu \rightarrow 1 = r \cos \mu \rightarrow \cos \mu = \frac{1}{r}$$

فعلية $\rightarrow \cos \mu < 0$, $\sin \mu > 0$, $\tan \mu < 0$, $\cot \mu > 0$

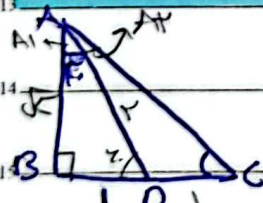
5  $\rightarrow \tan \mu = -\frac{1}{\sqrt{14}}$, $\cot \mu = -\sqrt{14}$

$$\frac{r \cot \mu}{-r \tan \mu} = \frac{+\sqrt{14}}{\frac{1}{\sqrt{14}}} = \frac{+\sqrt{14} \times 1}{1} = \frac{+14}{1} = 14$$

$$\frac{10 \lambda}{1 \lambda^0} = \frac{\frac{14 \mu}{\omega}}{\mu} \rightarrow \alpha_A R_A = \alpha_B R_B \quad (\Delta)$$

$$\frac{14 \mu}{\omega} \times R_A = \frac{10 \mu}{10} \times R_B \rightarrow \frac{R_A}{R_B} = \frac{5}{7}$$

$$\frac{S_A}{S_B} = \left(\frac{R_A}{R_B}\right)^2 \times \frac{\cancel{\alpha_A}^{14\mu}}{\cancel{\alpha_B}^{10\mu}} = \frac{9}{2} \rightarrow 9$$

13  $AD = 1 \times 2 = 2 \rightarrow$ فعلية $\rightarrow$ $AB = 2 \times \sqrt{5} = \sqrt{5}$ $\rightarrow$ فعلية $\rightarrow$

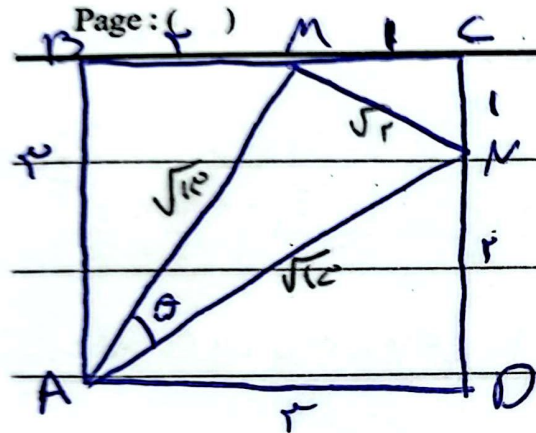
$$S_{ABC} = \sqrt{5} \rightarrow \frac{1}{2} \times AB \times BC = \sqrt{5} \rightarrow \frac{1}{2} \times \sqrt{5} \times BC = \sqrt{5}$$

$$BC = 2 \rightarrow DC = 1 , AC = \sqrt{5+2} = \sqrt{7}$$

$$\sin C = \frac{\sqrt{5}}{\sqrt{7}} , \cos C = \frac{1}{\sqrt{7}}$$

$$\sin \gamma = r \sin C \cos C = r \times \frac{\sqrt{5}}{\sqrt{7}} \times \frac{1}{\sqrt{7}} = \frac{r \sqrt{5}}{7} \rightarrow 9$$





$$MN = \sqrt{1+1} = \sqrt{2}$$

(10)

$$AM = \sqrt{3+9} = \sqrt{12}$$

$$AN = \sqrt{3+9} = \sqrt{12}$$

$$S_{\triangle ABC} = \frac{1}{2} \times 3 \times 4 = 6, S_{\triangle ABM} = S_{\triangle ADN} = \frac{1}{2} \times 1 \times 3 = \frac{3}{2}, S_{\triangle MNC} = \frac{1}{2} \times 1 \times 2 = \frac{1}{2}$$

$$S_{\triangle AMN} = 6 - \left(\frac{3}{2} + \frac{3}{2} \right) = 6 - 3 = 3$$

$$S_{\triangle AMN} = \frac{1}{2} \times \sqrt{12} \times \sqrt{12} \times \sin \theta = 3 \rightarrow \sin \theta = \frac{3}{5}$$