

۳: ۵۴'



$$\begin{aligned} 4 \times 30 &= 120^\circ \\ 120^\circ + 2^\circ + 27^\circ &= 149^\circ \\ \frac{27}{4} \times 30 &= 202.5^\circ \end{aligned}$$

الف)

$$\alpha = |5, 2M - 20h|$$

$$299 - 207 = 192^\circ$$

$$\alpha = |5, 2M - 20h| = 192^\circ$$

ب)

۹: ۱۸'

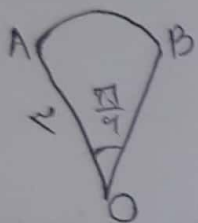
الف)



$$\alpha: 2 \times 30 = 90 + 12 + 9 = 111^\circ$$

ب)

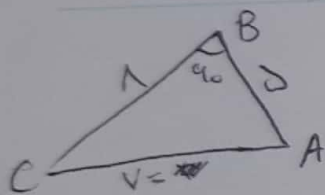
$$\alpha = |5, 2M - 20h| = |99 - 110| = 11^\circ$$



$$\begin{aligned} \text{مساحت} &= \frac{1}{2} \times \text{زاویه} \times R^2 \\ \text{مساحت} &= \frac{1}{2} \times \frac{\pi}{4} \times R^2 \end{aligned}$$

$$\text{مساحت} = \frac{1}{2} \times \frac{\pi}{4} \times R^2 = \frac{29\pi}{14} = \frac{29\pi}{14}$$

$$\text{محیط} = (2 \times R) + \left(\frac{\pi}{4} \times R \right) = 4 + \frac{\pi}{2}$$



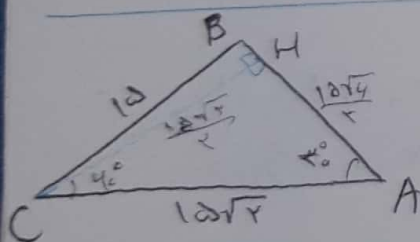
$$\frac{1}{2} \sin 60^\circ \times 1 \times 1 = \frac{1}{2} \times \frac{\sqrt{3}}{2} \times 1 \times 1 = \frac{\sqrt{3}}{4}$$

الف) مساحت مثلث ABC:

$$AC = \sqrt{1^2 + 1^2 - 2(1)(1)\cos 60^\circ} = \sqrt{2 - 1} = 1$$

$$\text{محیط} = 1 + 1 + 1 = 3$$

ب) محیط =



$$\triangle ABC: \hat{B} + \hat{C} = 120^\circ \quad AC = 10\sqrt{3} \quad BC = 10$$

$$\hat{B}, \hat{C} = ?$$

$$\begin{aligned} B + C = 120^\circ &\rightarrow A = 60^\circ \\ HA &= \cos 60^\circ = \frac{\sqrt{3}}{2} = 10\sqrt{3} \end{aligned}$$

$$\sin 60^\circ = \frac{1}{2} = \frac{CH}{10\sqrt{3}} \quad CH = 5\sqrt{3}$$

$$HA = \frac{10\sqrt{3}}{2} = 5\sqrt{3}$$

$$10 = BH \times BH + \frac{10\sqrt{3}}{2} \quad 10 \times$$

استفاده از قانون سینوس

$$\frac{10}{\frac{1}{2}} = \frac{10\sqrt{3}}{\sin B} = 20 = \frac{10\sqrt{3}}{\sin B} \Rightarrow \sin B = \frac{\sqrt{3}}{2} \rightarrow B \rightarrow 60^\circ = \left(\frac{\pi}{3} \right) = \hat{B}$$

$$\hat{C} = 180 - 60 - 60 = 60^\circ = 90 + 15 = \frac{\pi}{2} + \frac{\pi}{12} = \frac{5\pi}{12} + \frac{\pi}{12} = \frac{6\pi}{12} = \frac{\pi}{2} = \hat{C}$$

$$\frac{\tan(\pi-a) + r \tan(\pi+a)}{\tan(r\pi-a) - \tan(r\pi+a)} = \frac{-\tan a + r \tan a}{-\tan a - \tan a} = \frac{r \tan a}{-r \tan a} = \textcircled{-1}$$

$$\tan \frac{\pi}{r} = a \quad A = \frac{r \tan \sqrt{r} \delta + \tan \delta}{r \tan(140^\circ) - \tan \sqrt{r} \delta} \rightarrow \cot 140^\circ = \frac{1}{a}$$

$$\frac{\pi}{r} = 10^\circ \quad A = \frac{r \tan(\frac{\pi}{r} - 10^\circ) + \tan(\frac{\pi}{r} + 10^\circ)}{r \tan(\pi - 10^\circ) - \tan(\frac{\pi}{r} - 10^\circ)} = \frac{r \cot 10^\circ - \cot 10^\circ}{-r \tan 10^\circ - \cot 10^\circ} = \frac{\cot 10^\circ}{-r \tan 10^\circ - \cot 10^\circ}$$

$$\Rightarrow \frac{1}{a} = \frac{\frac{1}{a}}{-ra + 1} = \frac{1}{-ra + 1} \Rightarrow \frac{1}{-ra + 1} = \frac{1}{-ra + 1}$$

$$\frac{\sin x + \cos x}{\sin x - \cos x} + \frac{\sin x - \cos x}{\sin x + \cos x} = r$$

$$\tan^2 x = ?$$

$$\frac{\tan^2 x + 1}{\tan^2 x - 1} + \frac{\tan^2 x - 1}{\tan^2 x + 1} = r = \frac{\tan^2 x + 1 + \tan^2 x - 1}{\tan^2 x - 1}$$

$$\tan^2 x = \Delta$$

$$\frac{\sin^2 x - r \cos^2 x + 1}{\sin^2 x + r \cos^2 x - 1} = r$$

$$\tan^2 x = ?$$

$$\frac{\tan^2 x - r + \frac{1}{\cos^2 x}}{\tan^2 x + r - \frac{1}{\cos^2 x}} = r \quad \frac{1}{\cos^2 x} = \tan^2 x + 1 \rightarrow \frac{\tan^2 x - r + \tan^2 x + 1}{\tan^2 x + r - \tan^2 x - 1}$$

$$= r \tan^2 x - 1 = r \rightarrow \tan^2 x = \frac{r}{r-1}$$

$$\text{ii) } \cos^2 \frac{\pi}{r} = \frac{1 + \cos \frac{\pi}{r}}{2} = \frac{1 + \frac{1}{r}}{2} = \frac{1}{2} + \frac{1}{2r} = \frac{r+1}{2r}$$

$$\cos^2 \frac{\pi}{r} = \frac{r+1}{2r} \Rightarrow \cos \frac{\pi}{r} = \frac{\sqrt{r+1}}{\sqrt{2r}} = \frac{\sqrt{r+1}}{\sqrt{2r}}$$

$$\text{iii) } \sin^2 \frac{\pi}{r} = \frac{1 - \cos \frac{\pi}{r}}{2} = \frac{1 - \frac{1}{r}}{2} = \frac{1}{2} - \frac{1}{2r} = \frac{r-1}{2r}$$

$$\sin^2 \frac{\pi}{r} = \frac{r-1}{2r} \rightarrow \sin \frac{\pi}{r} = \frac{\sqrt{r-1}}{\sqrt{2r}}$$