

(۱)

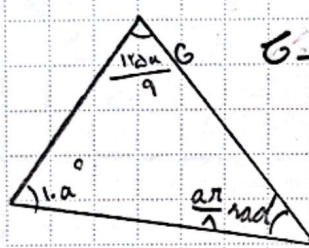
الف) $۲۷^\circ = (x) \text{ rad} \rightarrow \frac{۲۷}{۱۸۰} = \frac{x}{\pi} \rightarrow \frac{۲۷\pi}{۱۸۰} = \frac{x\pi}{\pi} \text{ rad} \rightarrow x = \frac{۲۷\pi}{۱۸۰}$

ب) $۱۲۵^\circ = (x) \text{ rad} \rightarrow \frac{۱۲۵}{۱۸۰} = \frac{x}{\pi} \rightarrow \frac{۱۲۵\pi}{۱۸۰} = \frac{x\pi}{\pi} \text{ rad} \rightarrow x = \frac{۱۲۵\pi}{۱۸۰}$

ج) $\frac{\Delta\pi}{۱۲} \text{ rad} = (x)^\circ \rightarrow \frac{\frac{\Delta\pi}{۱۲}}{\pi} = \frac{x}{۱۸۰} \rightarrow \frac{\Delta}{۱۲} = \frac{x}{۱۸۰} \rightarrow \frac{۱۸۰ \times \Delta}{۱۲} = ۱۵^\circ \rightarrow x = ۱۵$

د) $\frac{\varepsilon\pi}{9} \text{ rad} = (x)^\circ \rightarrow \frac{\frac{\varepsilon\pi}{9}}{\pi} = \frac{x}{۱۸۰} \rightarrow \frac{\varepsilon}{9} = \frac{x}{۱۸۰} \rightarrow \frac{\varepsilon \times ۱۸۰}{9} = ۱۸^\circ \rightarrow x = ۱۸$

(۲)



$G \rightarrow D \rightarrow \frac{12.5a}{9} = \frac{D}{180} \rightarrow \frac{12.5a}{90} = \frac{D}{180} \rightarrow \frac{12.5a \times 180}{90 \times 180} = (12.5a)^\circ$

$\text{rad} \rightarrow D \rightarrow \frac{\frac{a\pi}{9}}{\pi} = \frac{D}{180} = \frac{a}{9} = \frac{D}{180} \rightarrow \frac{180 \times a}{9} = (22.5a)^\circ$

$(10.2)^\circ + (12.5a)^\circ + (22.5a)^\circ = 180^\circ \rightarrow (35a)^\circ = 180^\circ \rightarrow a = \frac{180}{35} \rightarrow a = \varepsilon$

(۳)

الف) $\cos 4^\circ \cos 3^\circ - \sin 4^\circ \sin 3^\circ - \tan 2^\circ + \cot 2^\circ =$

$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2} - 1 + 2 = 1$

ب) $\frac{\tan^2 30^\circ + \tan^2 45^\circ + \tan^2 60^\circ}{\cot^2 30^\circ - \cot^2 45^\circ} = \frac{\frac{1}{3} + 1 + 3}{\frac{1}{3} - 1} = \frac{\frac{4}{3}}{-\frac{2}{3}} = -\frac{2}{1} = -2$

$$\theta < 90^\circ$$

(E)

$$\underbrace{-\sin 40^\circ}_{-\frac{1}{\sqrt{2}}} \underbrace{\cos 40^\circ}_{\frac{1}{\sqrt{2}}} + \underbrace{\cos 40^\circ}_{\frac{1}{\sqrt{2}}} \underbrace{\sin 40^\circ}_{\frac{1}{\sqrt{2}}} = \sin \theta$$

$$\left(-\frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}}\right) + \left(\frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}}\right) = -\frac{1}{2} + \frac{1}{2} = 0 \quad \sin \theta = \frac{1}{2}$$

$$\sin \theta = \frac{1}{2} \Rightarrow \theta = 30^\circ$$

$$\tan \theta = \tan 30^\circ = \frac{1}{\sqrt{3}}$$

$$\theta < 90^\circ$$

(D)

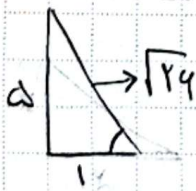
$$\frac{\frac{1}{\sqrt{3}} \tan 40^\circ (1 - \tan^2 40^\circ)}{(1 - \cot^2 40^\circ)^2} = \tan \theta$$

$$\frac{\frac{1}{\sqrt{3}} \times \frac{1}{\sqrt{3}}}{\left(\frac{1}{\sqrt{3}}\right)^2} = \frac{\frac{1}{3}}{\frac{1}{3}} = 1 \quad \tan \theta = 1 \Rightarrow \theta = 45^\circ \Rightarrow \theta = \frac{\pi}{4} \text{ rad}$$

$$\tan \theta = 1 \rightarrow \theta = 45^\circ \rightarrow \theta = \frac{\pi}{4} \text{ rad}$$

$$\tan \theta = \Delta \rightarrow \frac{\sin \theta}{\cos \theta} = \Delta$$

(4)

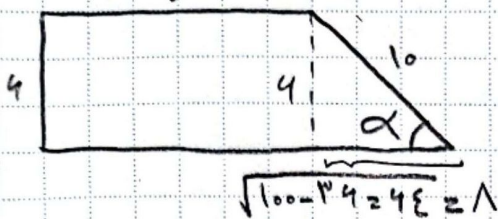


$$\frac{\sin \theta - \cos \theta}{\sin \theta + \cos \theta} = \frac{\left(\frac{1}{\sqrt{2}}\right) - \left(\frac{1}{\sqrt{2}}\right)}{\left(\frac{1}{\sqrt{2}}\right) + \left(\frac{1}{\sqrt{2}}\right)} = \frac{0}{\sqrt{2}} = 0$$

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

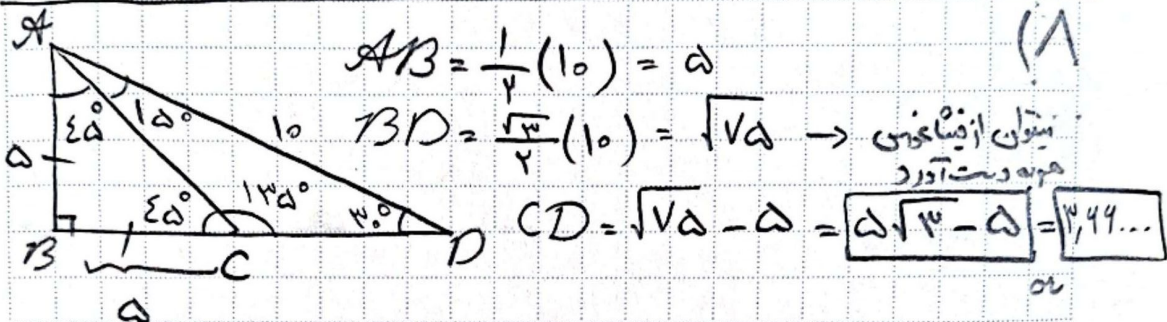
$$\sin \alpha = \frac{4}{10}$$

(V)



$$\text{محيط} = 4 + 10 + V + (V + 1) = 31$$

$$\text{محيط} = 31$$

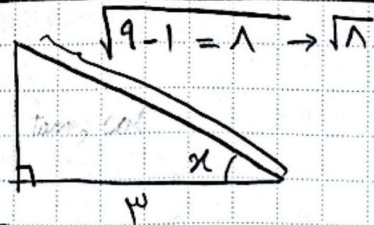


(الف) ناحیه دوم: چون $\sin$ و $\cos$ منفی هستند با افزایش زاویه $\sin$ و $\cos$ افزایش می‌یابد

(ب) ناحیه دوم: دلیل ناحیه ۲ با افزایش زاویه $\sin$ و $\cos$ می‌یابد و در $\cos$ افزایش ولی چون $\cos$ منفی است پس هر دو کاهش می‌یابند

$$\tan \alpha = \frac{1}{3}$$

$\cos, \sin =$ منفی
 $\tan, \cot =$ مثبت



$$\sin \alpha = \frac{\text{مقابل}}{\text{هypo}} = \frac{1}{\sqrt{10}}$$