

الف) $2V = (x) \text{ rad}$

$$\frac{D}{1A} = \frac{\text{Rad}}{\pi} \rightarrow \frac{2V}{1A} = \frac{\text{Rad}}{\pi} \rightarrow \text{Rad} = \frac{2V\pi}{1A} = \frac{2}{V}\pi \rightarrow \boxed{x = \frac{2}{V}\pi}$$

ب) $125 = (x) \text{ rad}$

$$\frac{D}{1A} = \frac{\text{Rad}}{\pi} \rightarrow \frac{125}{1A} = \frac{\text{Rad}}{\pi} \rightarrow \text{Rad} = \frac{125\pi}{1A} = \frac{125}{34}\pi \rightarrow \boxed{x = \frac{125}{34}\pi}$$

ج) $\frac{5\pi}{12} \text{ Rad} = (x)^\circ$

$$\frac{\text{Rad}}{\pi} = \frac{D}{1A} \rightarrow \frac{\frac{5\pi}{12}}{\pi} = \frac{D}{1A} \rightarrow \frac{5}{12} = \frac{D}{1A} \rightarrow D = \frac{1A \times 5}{12} = 1A \times 5 = 5A^\circ$$

$$\rightarrow \boxed{x = 5A^\circ}$$

د) $\frac{F\pi}{9} \text{ rad} = (x)^\circ \rightarrow \frac{\text{Rad}}{\pi} = \frac{D}{1A} \rightarrow \frac{\frac{F\pi}{9}}{\pi} = \frac{D}{1A} \rightarrow \frac{F}{9} = \frac{D}{1A}$

$$\rightarrow D = \frac{1A \times F}{9} = 20 \times F = 1A^\circ \rightarrow \boxed{x = 1A^\circ}$$

$(1.0)^\circ$, $(\frac{125a}{9})G$, $(\frac{a\pi}{1A}) \text{ rad}$

$$\frac{D}{1A} = \frac{G}{V} \rightarrow \frac{D}{1A} = \frac{\frac{125a}{9}}{\frac{V}{1}} \rightarrow \frac{D}{1A} = \frac{125a}{1A \times V} \rightarrow D = \frac{125a \times 1A}{1A \times V} = \frac{125a}{V}$$

$$\frac{D}{1A} = \frac{\text{Rad}}{\pi} \rightarrow \frac{D}{1A} = \frac{\frac{a\pi}{1A}}{\pi} \rightarrow \frac{D}{1A} = \frac{a}{1A} \rightarrow D = \frac{1A \times a}{1A} = \frac{Fa}{V}$$

$$1.0^\circ + \frac{125a}{V} a^\circ + \frac{Fa}{V} a^\circ = 1A^\circ \rightarrow 1.0^\circ + \frac{125Fa}{V} a^\circ = 1A^\circ$$

$$Fa a^\circ = 1A^\circ \rightarrow a^\circ = \frac{1A}{F} = \frac{V}{F} = F^\circ \rightarrow \boxed{(a)^\circ = F^\circ}$$

①

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

$$\frac{1}{V} \times \frac{\sqrt{3}}{V} - \frac{\sqrt{3}}{V} \times \frac{1}{V} - 1 + 2 = \frac{\sqrt{3}}{V} - \frac{\sqrt{3}}{V} - 1 + 2 = \boxed{1}$$

ب) $\frac{\tan^2 1^\circ + \tan^2 4^\circ + \tan^2 9^\circ}{\cot 3^\circ - \cot 4^\circ} =$

$$\frac{(\frac{1}{\sqrt{3}})^2 + 1 + (\sqrt{3})^2}{(\sqrt{3}) - (\frac{1}{\sqrt{3}})} = \frac{\frac{1}{3} + 1 + 3}{\frac{3-1}{\sqrt{3}}} = \frac{\frac{13}{3}}{\frac{2}{\sqrt{3}}} = \frac{13\sqrt{3}}{6}$$

ج) $-\sin 3^\circ \cos 4^\circ + \cos 3^\circ \sin 4^\circ = \sin^2 \theta$

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

$$\sin^2 \theta = \frac{1}{V} \rightarrow \sin \theta = \pm \sqrt{\frac{1}{V}} \rightarrow \sin \theta = +\frac{1}{\sqrt{V}} = +\frac{\sqrt{V}}{V}$$

$$\cos^2 \theta = 1 - \sin^2 \theta = 1 - \frac{1}{V} = \frac{1}{V}$$

$$\cos \theta = \pm \sqrt{\frac{1}{V}} \rightarrow \cos = +\frac{\sqrt{V}}{V}$$

چون زاویه θ حاده است هم $\sin$ مثبت است و هم $\cos$ مثبت باشد

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{\frac{\sqrt{V}}{V}}{\frac{\sqrt{V}}{V}} = 1$$

$$\boxed{\tan \theta = 1}$$

$$\frac{r \tan^r(\frac{\pi}{2}) (1 - \tan^r(\frac{\pi}{2}))}{(1 - \cot^r(\frac{\pi}{2}))^r} = \tan \theta$$

$$\frac{r \times \frac{1}{\sqrt{r}} (1 - (\frac{1}{\sqrt{r}})^r)}{(1 - (\frac{1}{\sqrt{r}})^r)^r} = \frac{\frac{r}{\sqrt{r}} (1 - \frac{1}{r})}{(1 - \frac{1}{r})^r} = \frac{\frac{r}{\sqrt{r}} (\frac{r-1}{r})}{(\frac{r-1}{r})^r} = \frac{\frac{r}{\sqrt{r}}}{\frac{r-1}{r}} = \frac{r}{\sqrt{r}} = \sqrt{r}$$

$$\tan \theta = \frac{r}{\sqrt{r}} \times \frac{\sqrt{r}}{r} = \frac{r \sqrt{r}}{r} = \sqrt{r}$$

$$1 + \tan^r \theta = \frac{1}{\cos^r \theta} \rightarrow 1 + (\sqrt{r})^r = \frac{1}{\cos^r \theta} \rightarrow r = \frac{1}{\cos^r \theta}$$

$$\cos^r \theta = \frac{1}{r} \rightarrow \cos \theta = \pm \frac{1}{r} \rightarrow \cos \theta = \frac{1}{r} \quad \text{جمله مثبت است}$$

$$\sin^r \theta = 1 - \cos^r \theta = 1 - \frac{1}{r} = \frac{r-1}{r} \rightarrow \sin \theta = \sqrt{\frac{r-1}{r}}$$

$$\left| \frac{1}{r} \right| \Rightarrow \theta = 45^\circ \rightarrow \frac{D}{1A} = \frac{\text{Rad}}{\pi} \rightarrow \frac{45}{1A} = \frac{\text{Rad}}{\pi}$$

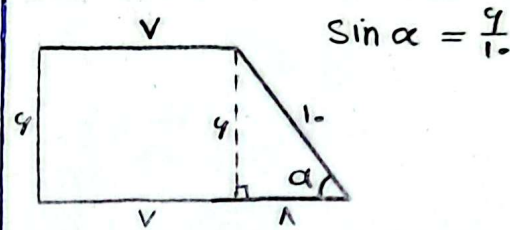
$$\text{Rad} = \frac{45 \cdot \pi}{1A} = \frac{\pi}{r} \rightarrow \boxed{\text{Rad} = \frac{\pi}{r}}$$

$$\tan \theta = \omega$$

$$\frac{r \sin \theta - \cos \theta}{\sin \theta - r \cos \theta} = \frac{\frac{r \sin \theta}{\cos \theta} - \frac{\cos \theta}{\cos \theta}}{\frac{\sin \theta}{\cos \theta} - \frac{r \cos \theta}{\cos \theta}} = \frac{r \tan \theta - 1}{\tan \theta - r} = \frac{r \times \omega - 1}{\omega - r}$$

$$\frac{1\omega - 1}{\omega - r} = \frac{1r}{1} = \boxed{1r}$$

⑤



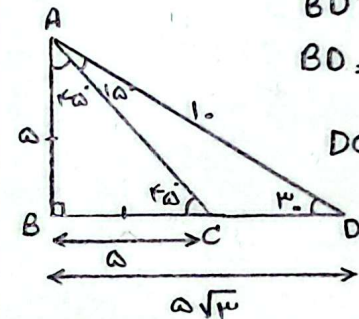
$$\sin \alpha = \frac{4}{5}$$

$$\sin \alpha = \frac{\text{opp}}{\text{hyp}} = \frac{4}{5} \rightarrow \frac{4}{5} = \frac{4}{5} \rightarrow \text{hyp} = 5$$

$$1 - 4^r = 1 - 4 = -3 \rightarrow \sqrt{-3} = \text{imaginary}$$

$$\text{Perimeter} = 4 + 5 + 5 + 1 + 1 = \boxed{16}$$

⑥



$$BD^r = 1 - \omega^r = 1 - 2\omega = \sqrt{2}\omega$$

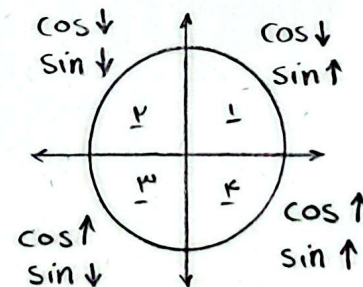
$$BD = \sqrt{2}\omega = \sqrt{2 \times 2\omega} = \omega\sqrt{2}$$

$$DC = \omega\sqrt{2} - \omega = \omega(\sqrt{2} - 1)$$

$$\boxed{DC = \omega(\sqrt{2} - 1)}$$

⑦

⑧



ربع سوم $\sin \theta \downarrow, \cos \theta \uparrow$

ربع دوم $\sin \theta \downarrow, \cos \theta \downarrow$

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

(10)

$$1 + \tan^2 x = \frac{1}{\cos^2 x} \rightarrow 1 + \left(\frac{1}{\sqrt{10}}\right)^2 = \frac{1}{\cos^2 x}$$

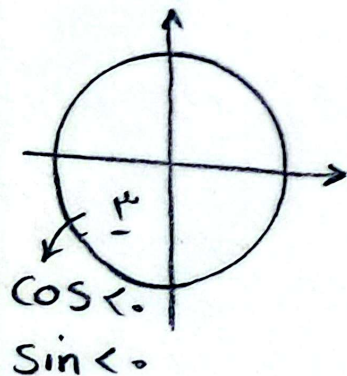
$$1 + \frac{1}{10} = \frac{1}{\cos^2 x} \rightarrow \frac{11}{10} = \frac{1}{\cos^2 x} \rightarrow \cos^2 x = \frac{10}{11}$$

$$\cos x = \pm \sqrt{\frac{10}{11}} = \pm \frac{\sqrt{10}}{\sqrt{11}} \rightarrow \cos x = -\frac{\sqrt{10}}{\sqrt{11}} \times \frac{\sqrt{11}}{\sqrt{11}} = -\frac{\sqrt{110}}{11}$$

$$\cos x = -\frac{\sqrt{10}}{\sqrt{11}} = -\frac{\sqrt{110}}{11}$$

$$\sin^2 x = 1 - \cos^2 x = 1 - \frac{10}{11} = \frac{11-10}{11} = \frac{1}{11}$$

$$\sin^2 x = \frac{1}{11} \rightarrow \sin x = \pm \sqrt{\frac{1}{11}} = \pm \frac{1}{\sqrt{11}} \rightarrow \sin x = -\frac{1}{\sqrt{11}}$$



$$-\frac{1}{\sqrt{11}} \times \frac{\sqrt{11}}{\sqrt{11}} = -\frac{\sqrt{11}}{11}$$

$$\boxed{\sin x = -\frac{1}{\sqrt{11}} = -\frac{\sqrt{11}}{11}}$$