

$$\text{الف)} \quad \frac{27}{180} = \frac{\text{Rad}}{\pi} \Rightarrow \frac{3\pi}{20} \text{ rad}$$

$$\text{ب)} \quad \frac{125}{180} = \frac{\text{Rad}}{\pi} \Rightarrow \frac{25\pi}{36} \text{ rad}$$

$$\text{ج)} \quad \frac{5\pi}{\pi} = \frac{2}{180} \rightarrow \frac{5}{12} = \frac{D}{180} \rightarrow D = 75^\circ$$

$$\text{د)} \quad \frac{8\pi}{9} = \frac{D}{180} \rightarrow D = 160^\circ$$

$$\left. \begin{aligned} \frac{125a}{9} = \frac{D}{180} \Rightarrow D = 12/5a \\ \frac{a\pi}{\pi} = \frac{D}{180} \Rightarrow D = 22/5a \end{aligned} \right\} \begin{aligned} 10a + 22/5a + 12/5a &= 180^\circ \\ 8a &= 180 \rightarrow a = 22.5^\circ \end{aligned}$$

$$\text{الف)} \quad \frac{1}{2} \times \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} \times \frac{1}{2} - 1 + 2(1) = 2 - 1 = 1$$

$$\text{ب)} \quad \frac{\left(\frac{\sqrt{3}}{2}\right)^2 + 1^2 + \left(\frac{\sqrt{3}}{2}\right)^2}{\sqrt{3} - \frac{\sqrt{3}}{2}} = \frac{\frac{3}{4} + 1 + 3}{\frac{2\sqrt{3}-\sqrt{3}}{2}} = \frac{1+3+9}{\frac{\sqrt{3}}{2}} = \frac{13}{\frac{\sqrt{3}}{2}} = \frac{26}{\sqrt{3}}$$

$$-\frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \sin^2 \theta \rightarrow -\frac{1}{4} + \frac{3}{4} = \frac{2}{4} = \frac{1}{2} = \sin^2 \theta$$

$$\sin \theta = \frac{\sqrt{2}}{2} \rightarrow \theta < 90^\circ \rightarrow \theta = 45^\circ$$

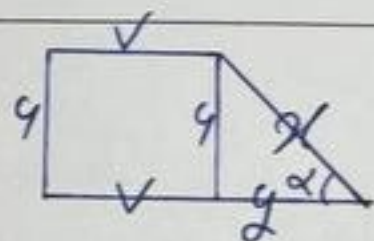
$$\tan 45^\circ = 1$$

$$\frac{2\left(\frac{\sqrt{3}}{2}\right)\left(1 - \frac{1}{3}\right)}{\left(1 - \frac{1}{3}\right)^2} = \frac{\frac{4\sqrt{3}}{9}}{\frac{4}{9}} = \sqrt{3} = \tan \theta \xrightarrow{\theta < 90^\circ} \theta = 60^\circ$$

$$\frac{4}{180} = \frac{\text{Rad}}{\pi} \Rightarrow \theta = \frac{\pi}{45}$$

$$\frac{\frac{3\sin\theta - \cos\theta}{\cos\theta}}{\frac{\sin\theta - 3\cos\theta}{\cos\theta}} = \frac{3\tan\theta - 1}{\tan\theta - 3} = \frac{15 - 1}{5 - 3} = \boxed{14}$$

۶

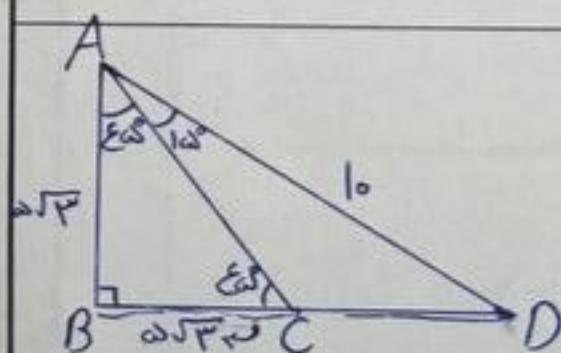


$$\frac{y}{x} = \frac{4}{10} \rightarrow x = 10$$

$$4^2 + y^2 = 10^2 \rightarrow y^2 = 100 - 16 \rightarrow y = 8$$

$$\text{محیط } P: 4 + 4 + 10 + 4 + 8 = \boxed{38}$$

۷



$$\cos 45^\circ = \frac{AB}{AD} \rightarrow \frac{AB}{10} = \frac{1}{\sqrt{2}} \rightarrow AB = 5 = BC$$

$$\sin 45^\circ = \frac{BD}{AD} \rightarrow \frac{5\sqrt{2}}{2} = \frac{BD}{10} \rightarrow BD = 5\sqrt{2}$$

$$CD = BD - BC = 5\sqrt{2} - 5$$

۸



الف) $\sin\theta$ کاهش $\leftarrow 4, 2$. $\cos\theta$ افزایش $\leftarrow 3, 4$ $\Rightarrow$ ناحیه ۴

ب) $\sin\theta$ کاهش $\leftarrow 4, 2$. $\cos\theta$ کاهش $\leftarrow 1, 2$ $\Rightarrow$ ناحیه ۲

۹

$$\tan x = \frac{1}{3} \rightarrow \cot x = 3$$

$$\cot^2 x + 1 = \frac{1}{\sin^2 x} \rightarrow 10 = \frac{1}{\sin^2 x} \rightarrow \sin x = \frac{1}{\sqrt{10}} = \boxed{\frac{\sqrt{10}}{10}}$$

۱۰