آذین پورعسکری

(۱)

الف) $27^\circ = (x)\,rad \rightarrow \frac{27}{180} = \frac{x}{\pi} \rightarrow 27\pi = 180x \rightarrow \frac{27\pi}{180} = \frac{9\pi}{60} = \frac{3\pi}{20}$

ب) $125^\circ = (x)\,rad \rightarrow \frac{125}{180} = \frac{x}{\pi} \rightarrow 125\pi = 180x \rightarrow x = \frac{125\pi}{180} = \frac{25\pi}{36}$

ج) $\frac{5\pi}{12}\,rad = (x)^\circ \rightarrow \frac{\frac{5\pi}{12}}{\frac{\pi}{1}} = \frac{x}{180} \rightarrow \frac{5\pi}{12\pi} = \frac{x}{180} \rightarrow 12x = 900^\circ \rightarrow x = 75^\circ$

د) $\frac{4\pi}{9}\,rad = (x)^\circ \rightarrow \frac{\frac{4\pi}{9}}{\frac{\pi}{1}} = \frac{x}{180} \rightarrow \frac{4\pi}{9\pi} = \frac{x}{180} \rightarrow 9x = 720^\circ \rightarrow x = 80^\circ$

(۲)

$10a^\circ + \frac{125a}{9}$ گراد $+ \frac{a\pi}{8}$ رادیان $= 180^\circ$

(۱) $10a^\circ = 10a^\circ$

(۲) $\frac{\frac{125a}{9}}{\frac{200}{1}} = \frac{x}{180} = \frac{125a}{200} = \frac{x}{180} \rightarrow 200x = 22500a \rightarrow x = 112.5a$

(۳) $\frac{\frac{a\pi}{8}}{\frac{\pi}{1}} = \frac{x}{180} \rightarrow \frac{a\pi}{8\pi} = \frac{x}{180} \rightarrow 8x = 180a \rightarrow x = 22.5a$

$\rightarrow 10a^\circ + 112.5a^\circ + 22.5a^\circ = 180 \rightarrow 145a = 180 \rightarrow a = \frac{180}{145} = \frac{36}{29}$

(۳)

الف) $\cancel{\frac{1}{2} \times \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} \times \frac{1}{2}} - 1 + 2 = \boxed{1}$

ب) $\frac{\frac{\sqrt{3}}{3} \times \frac{\sqrt{3}}{2} + 1 \times 1 + \sqrt{3} \times \sqrt{3}}{\sqrt{3} - \frac{\sqrt{3}}{3}} = \frac{\frac{3}{6} + 1 + 3}{\frac{2\sqrt{3}}{3}} = \frac{\frac{39}{6}}{\frac{2\sqrt{3}}{3}} = \frac{13}{2\sqrt{3}}$

$= \frac{13\sqrt{3}}{6}$

(۴)

$\frac{1}{4} + \frac{3}{4} = \sin^2\theta \rightarrow \frac{1}{2} = \sin^2\theta \rightarrow \sin\theta = \frac{\sqrt{2}}{2} \rightarrow \theta = 45^\circ$

$\tan\theta = \tan 45^\circ = \boxed{1}$

آزمون پودمانی

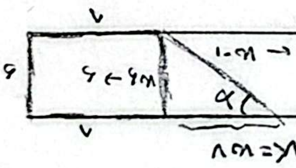
⑤ $2\left(\frac{\sqrt{3}}{3}\right)\left(1-\cancel{\left(\frac{\sqrt{3}}{3}\right)^2}\right) = \frac{2\sqrt{3}}{3}\times\frac{6}{9} = \frac{4\sqrt{3}}{9}$ ← صورت

$\underbrace{\left(1-\left(\frac{\sqrt{3}}{3}\right)^2\right)^2}_{\frac{6}{9}} = \frac{36}{81}$ ← مخرج

$\to \frac{\frac{4\sqrt{3}}{9}}{\frac{36}{81}} = \frac{81\times4\sqrt{3}}{9\times36} = \sqrt{3} = \tan\theta \to \theta = 60^\circ = \frac{\pi}{3}$

⑥ $\tan\theta = 5$ کل عبارت را بر $\cos$ تقسیم می‌کنیم $\to \dfrac{\frac{3\sin\theta}{\cos\theta}-\frac{\cos\theta}{\cos\theta}}{\frac{\sin\theta}{\cos\theta}-\frac{4\cos\theta}{\cos\theta}} = \dfrac{3\overset{5}{\tan}-1}{\underset{5}{\tan}-4} = \frac{14}{1} = \boxed{14}$

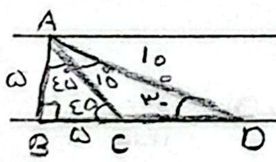
⑦



$\sin\alpha = \frac{\text{مقابل}}{\text{وتر}} = \frac{6}{10} \to x = 1$

محیط $\to 6+7+10+8+7 = \boxed{38}$

⑧



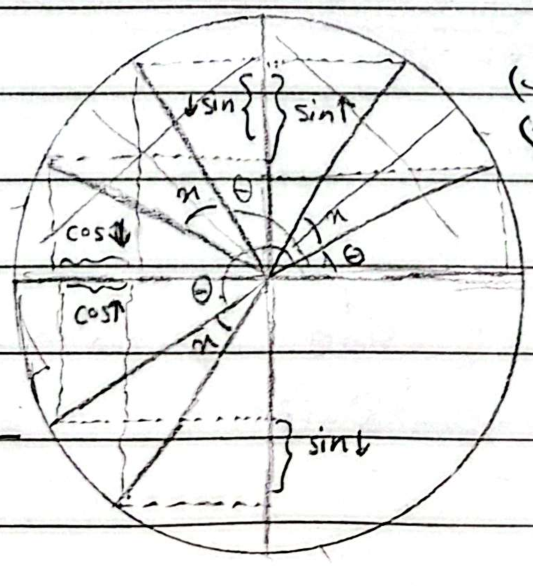
ضلع مقابل به زاویه 30° نصف وتر است $\to AB = \frac{1}{2}10 = 5$

فیثاغورس $\to \sqrt{100-25} = \sqrt{75} = 5\sqrt{3} = BD$ و $\frac{\sqrt{2}}{2}$ ضلع مقابل به زاویه 45° وتر است $\to 5 = \frac{\sqrt{2}}{2}$ وتر

$\to \underset{}{\overset{5\sqrt{3}}{BD}} - \underset{5}{BC} = CD \to \boxed{CD = \sqrt{3}}$

← چون هر دو زاویه 45° اند

⑨ الف و ب



← ناحیه ۲ جواب می‌دهد = ب

← ناحیه ۳ جواب می‌دهد = الف

(15)

$\tan x = \frac{1}{3} \rightarrow 1 + \tan^2 = \frac{1}{\cos^2} \rightarrow 1 + \frac{1}{9} = \frac{1}{\cos^2} = \frac{10}{9} = \frac{1}{\cos^2}$

$\rightarrow 10\cos^2 = 9 \rightarrow \boxed{\cos = -\frac{3}{\sqrt{10}}} \rightarrow$ چون کسینوس در ناحیه ۳ منفیه

$\cos^2 + \sin^2 = 1 \rightarrow \frac{9}{10} + ? = 1 \rightarrow \sin^2 = \frac{1}{10} \rightarrow \boxed{\sin x = -\frac{1}{\sqrt{10}}} \rightarrow$ چون سینوس در ناحیه ی ۳ منفیه