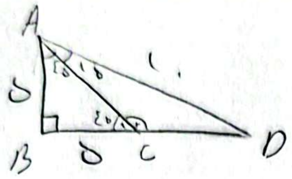
۸)



$\hat{A} = ۶۰ \to \left[\begin{array}{l} \dfrac{BD}{\underbrace{AD}_{۱۰}} = \dfrac{\sqrt{۳}}{۲} \to BD = ۵\sqrt{۳} \\ \dfrac{AB}{\underbrace{AD}_{۱۰}} = \dfrac{۱}{۲} \to AB = ۵ \end{array} \right\} \quad \underbrace{\overline{DC = ۵\sqrt{۳} - ۵}}$

$A_1 = C_1 = ۴۵ \to AB = BC = ۵$

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۹) الف) θ زیاد $\to$ $\underbrace{\sin\theta \text{ کم}}_{\text{ناحیه ۲ و ۳}}$ $\to$ $\underbrace{\cos\theta \text{ زیاد}}_{\text{ناحیه ۳ و ۴}}$ $\to$ $\boxed{\text{ناحیه ۳}}$

ب) θ زیاد $\to$ $\underbrace{\underbrace{\sin\theta \text{ کم}}_{\text{۲ و ۳}} \to \underbrace{\cos\theta \text{ کم}}_{\text{۱ و ۲}}}_{\text{ناحیه ۲}}$

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۱۰)

$\tan x = \dfrac{\sin x}{\cos x} = \dfrac{۱}{۳} \to \cos x = ۳\sin x, \quad \underbrace{\sin x < ۰, \cos x < ۰}_{\text{ناحیه ۳}}$

$\sin^2 + \cos^2 = ۱ \to \sin^2 x + ۹\sin^2 x = ۱۰\sin^2 x = ۱$

$\sin x = \pm \dfrac{\sqrt{۱۰}}{۱۰}$

ناحیه ۳، $\sin x$ منفی

امیدی رودی

(۱)

الف) $\frac{D}{180} = \frac{Rad}{\pi} \to \frac{270}{180} = \frac{Rad}{\pi} \to \boxed{\frac{3\pi}{2}}$

ج) $\frac{D}{180} = \frac{\frac{5\pi}{12}}{\frac{\pi}{1}} = \frac{5 \times 180}{12} = \boxed{75^\circ}$

ب) $\frac{125}{180} = \frac{Rad}{\pi} \to \boxed{\frac{25\pi}{36}}$

د) $\frac{D}{180} = \frac{\frac{4\pi}{9}}{\frac{\pi}{1}} = \frac{4 \times 180}{9} = \boxed{80^\circ}$

(۲)

$\frac{\frac{125a}{9}}{200} = \frac{D}{180} \to \frac{1250}{1800} = \frac{D}{180} \to D = \frac{125 \times 180}{100} = 12/5a$

$\frac{\frac{a\pi}{8}}{\pi} = \frac{D}{180} \Rightarrow D = \frac{a \times 180}{8} = 22/5a$

$10a$

$22/5a + 12/5a + 10a = 180$

$45a = 180$

$a = \frac{180}{45} = \boxed{4}$

(۳)

الف) $\underbrace{\cos 60^\circ \cos 30 - \sin 60 \sin 30}_{} - \tan 45^\circ + 2\cot 45 = 0 + \cot 45 = \boxed{1}$

$\sin 60 = \cos 30 ,\ \sin 30 = \cos 60 \to$

$\cos 60 \cos 30 = \sin 60 \sin 30$

$\cos 60 \cos 30 - \sin 60 \sin 30 = 0$

$\cot 45 = \tan 45$

$-\tan 45 + 2\cot 45 = \cot 45$

ب) $\frac{\tan^2 30 + \tan^2 45 + \tan^2 60}{\cot 30 - \cot 60} = \frac{\left(\frac{1}{\sqrt{3}}\right)^2 + 1^2 + (\sqrt{3})^2}{(\sqrt{3}) - \left(\frac{1}{\sqrt{3}}\right)} = \frac{\frac{13}{3}}{\frac{2}{\sqrt{3}}} = \frac{13\sqrt{3}}{6}$

(۴)

$-\sin 30 . \cos 60 + \cos 30 . \sin 60 = \sin^2\theta \Rightarrow -\sin^2 30 + \cos^2 30 = -\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{2}{4} \Rightarrow \sin\theta = \pm\frac{\sqrt{2}}{2}$

$\theta = 45^\circ \to \tan 45 = \frac{\sin 45}{\cos 45} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$

چون زاویه حاده (+) قابل قبول

(۵)

$\frac{2\tan 30 \left(1 - \tan^2 30\right)}{\left(1 - \cot^2 60\right)^2} = \tan\theta \to \frac{2\left(\frac{1}{\sqrt{3}}\right)\overbrace{\left(1 - \left(\frac{1}{\sqrt{3}}\right)^2\right)}^{\frac{2}{3}}}{\underbrace{\left(1 - \left(\frac{1}{\sqrt{3}}\right)^2\right)^2}_{\frac{4}{9}}} = \frac{\frac{1}{\sqrt{3}}}{\frac{1}{3}} = \sqrt{3} = \tan\theta \to \theta = 60^\circ = \frac{\pi}{3} Rad$

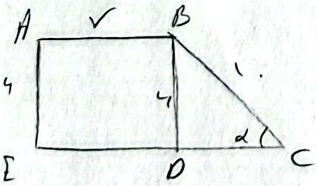
حاده

(۶)

$\tan\theta = 5 \to \frac{\sin\theta}{\cos\theta} = 5 \to \sin\theta = 5\cos\theta \to \frac{3\sin\theta - \cos\theta}{\sin\theta - 4\cos\theta} = \frac{15\cos\theta - \cos\theta}{5\cos\theta - 4\cos\theta}$

$\frac{14\cos\theta}{\cos\theta} = 14$

(۷)



$\to \frac{\overset{6}{BD}}{BC} = \frac{6}{10} \to DC = \sqrt{10^2 - 6^2} = \sqrt{64} = 8$

$P = 6 + 7 + 10 + 8 + 7 = \boxed{38}$