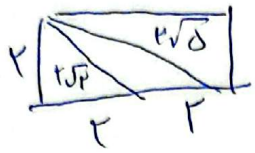
(۱)

$S_{\triangle} = \frac{1}{2} AB \cdot S_{in} \theta \rightarrow \frac{9}{2} = \frac{1}{2} \times 3\sqrt{2} \times 3\sqrt{2} \times S_{in}\theta \Rightarrow S_{in}\theta = \frac{\sqrt{3}}{2}$

$\Rightarrow \alpha = \frac{\pi}{3}$ یا $\alpha = \frac{2\pi}{3}$ $\quad \alpha < 120^\circ$ $\quad \frac{120^\circ}{\alpha} = 2$

(۲)

$S_{\square} = 8$



$\frac{1}{2} \times 2\sqrt{2} \times 2\sqrt{5} \times S_{in}\alpha = 2 \Rightarrow S_{in}\alpha = \frac{1}{\sqrt{10}}$ ، $\frac{1}{S_{in}^2\alpha} = 1 + Cot^2\alpha \rightarrow |Cot\alpha| = 3$

$\rightarrow Cot\alpha = 3$

(۳)

$tan\frac{\alpha}{2} = \frac{2}{x}$ $\quad tan\alpha = \frac{x}{3}$ $\quad tan 2\alpha = \frac{2tan\alpha}{1 - tan^2\alpha} \rightarrow \frac{2}{x} = \frac{\frac{2x}{3}}{1 - \frac{x^2}{9}} \rightarrow x = \frac{3}{2}$

$\Rightarrow Cot\alpha = \frac{1}{\frac{3}{2}} = 4$

(۴)

$AH^2 = AB^2 - BH^2 \rightarrow AH = \sqrt{5}$

$tan(\pi - \alpha) = \frac{\sqrt{5}}{2} \rightarrow tan\alpha = \frac{\sqrt{5}}{2} \rightsquigarrow tan\alpha = -\frac{\sqrt{5}}{2}$

$-tan\alpha$

(۵)

$2Sin^2 x + Cos^2 x = Sin^2 x + 1 = \frac{5}{4} \rightarrow |Sin x| = \sqrt{\frac{1}{4}}$

$Sin^2 + Cos^2 = 1 \xrightarrow{Sin^2 = \frac{1}{4}} Cos^2 x = \frac{3}{4} \Rightarrow tan^2 x = \frac{\frac{1}{4}}{\frac{3}{4}} = \frac{1}{3}$

$\sin\left(\frac{9\pi}{2}+\alpha\right)=\cos\alpha$

$-\tan\left(\alpha-\frac{3\pi}{2}\right)=\cot\alpha$

$\cos\left(\frac{7\pi}{2}-\alpha\right)=-\sin\alpha$

$$A=\frac{(\cos\alpha)\left(\frac{-4}{5}\right)}{\frac{3}{5}}+\cot\alpha=\frac{-12}{25}+\frac{3}{4}=\frac{75-48}{100}=\boxed{\frac{27}{100}}$$

$\tan^2\alpha+1=\frac{1}{\cos^2\alpha}$

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$\cos f_{14}=\cos\frac{14\pi}{3}=\frac{1}{2}$

$\cos^2\frac{\pi}{12}=\frac{1+\cos\frac{\pi}{6}}{2}\rightarrow\cos\frac{\pi}{12}=\frac{\sqrt{2+\sqrt{3}}}{2}$

$\sin^2\frac{\pi}{12}=\frac{1-\cos\frac{\pi}{6}}{2}\rightarrow\frac{2-\sqrt{3}}{4}\rightarrow\sin\frac{\pi}{12}=\frac{\sqrt{2-\sqrt{3}}}{2}$

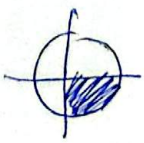
$$\rightarrow 2\left(\frac{1}{2}\right)+\sqrt{2}\left(\frac{\sqrt{2-\sqrt{3}}}{2}-\frac{\sqrt{2+\sqrt{3}}}{2}\right)=\boxed{\frac{1}{2}}$$

۱۸

۱۹

$2\sin\alpha<\sin^2\alpha\Rightarrow 2\sin\alpha<2\sin\alpha\cos\alpha\xrightarrow[\cos\alpha\le 1]{0<\cos\alpha<1}\sin\alpha<0$

$0<\frac{\cot\alpha}{\sin\alpha}\rightarrow\frac{\cos\alpha}{\sin\alpha}>0\rightarrow\cos\alpha>0$



در ناحیه‌ی ۴ ام می‌باشد.

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