بنام خدا

امیرمهدی اسماعیلی فرد دوازدهم پسر A

۱۸

-۱ $T = \frac{\pi}{2} = \overline{AC}$ $\quad f(0)=? \to \tan(\frac{\pi}{4}) = 1 = \overline{OB}$

$S = \frac{\pi}{2} \times 1 \times \frac{1}{2} = \boxed{\frac{\pi}{4}}$

(۲) ✓

-۲ $\xrightarrow{x=\frac{2}{3}} \frac{4}{9} - \frac{2}{3}\sin\alpha = \frac{1}{4} - \frac{\sin^2\alpha}{4} \to 9\sin^2\alpha - 24\sin\alpha + 7 = 0$

ادی $(\sin\alpha - 21)(\sin\alpha - 3) = 0$

$\sin\alpha \begin{cases} \frac{21}{9} & \times \\ \frac{3}{9} & ✓ \end{cases}$

$1+\tan^2\alpha = \frac{1}{\cos^2\alpha} = \frac{1}{1-\sin^2\alpha} = \frac{1}{1-\frac{1}{9}} = \boxed{\frac{9}{8}}$

(۲) ✓

-۳ $D: \quad \log(-\tan x) = \log 3 \to \tan\alpha = -3$

$\xrightarrow[\cos\alpha<0]{\sin\alpha>0} (\sin\alpha - \cos\alpha)^2 = 1 - \sin 2\alpha \xrightarrow{\sin 2\alpha = \frac{2\tan\alpha}{1+\tan^2\alpha}} |\sin\alpha - \cos\alpha| = \sqrt{1 - \frac{-6}{1+9}}$

$\to |\sin\alpha - \cos\alpha| = \frac{2\sqrt{5}}{5} \to \sin\alpha - \cos\alpha = \boxed{\frac{2\sqrt{5}}{5}}$

بزرگتر از صفر

(۲) ✓

-۴ $\sin^4\alpha - \sin^2 + \frac{1}{5} = 0 \to \sin^2\alpha = t, \ 5t^2 - 5t + 1 = 0$

$t \begin{cases} \frac{5-\sqrt{5}}{10} & ✓ \\ \frac{5+\sqrt{5}}{10} & ✓ \end{cases}$

$\to \begin{cases} \sin^2\alpha = \frac{5-\sqrt{5}}{10} \to \cos^2\alpha = \frac{5+\sqrt{5}}{10} \\ \cos^2\alpha = \frac{5-\sqrt{5}}{10} \to \sin^2\alpha = \frac{5+\sqrt{5}}{10} \end{cases} \to A = \left(\frac{5-\sqrt{5}}{10}\right)^2 + \frac{5+\sqrt{5}}{10} = \frac{3-\sqrt{5}+5+\sqrt{5}}{10} = \boxed{0/8}$

(۲) ✓

-۵ $\frac{\sin\alpha(3+\cos\alpha)}{2\sin^2\alpha} < 0 \xrightarrow{2\sin^2\alpha > 0} \sin\alpha\overbrace{(3+\cos\alpha)}^{+} < 0 \to \sin\alpha < 0$

$2 \leq 3+\cos\alpha \leq 4$

$\to \frac{\sin^2\alpha}{\cos\alpha} - \frac{1}{\cos\alpha} = \frac{-\cos^2\alpha}{\cos\alpha} > 0 \to \frac{\cos^2\alpha}{\cos\alpha} < 0 \to \cos\alpha < 0$

(۲) ✓

[illegible] مسلمانی

۶-

$$\frac{2\cos x + 3\sin x}{\sin x \cos x} = 0 \longrightarrow -\frac{2}{3} = \tan x \longrightarrow -\frac{3}{2} = \cot x$$

$$\tan x + \cot x = -\frac{2}{3} - \frac{3}{2} = \frac{-4-9}{6} = \boxed{\frac{-13}{6}}$$

۲ ✓

۷-

$$\frac{\sqrt{1+\cos 40^\circ}}{\cos 40^\circ + \sin 10^\circ} = \frac{\sin 25^\circ + \cos 25^\circ}{\cos 20^\circ} = \frac{\sqrt{2}\sin(25+45)}{\cos 20} = \frac{\sqrt{2}\sin 70^\circ}{\cos 20} = \boxed{\sqrt{2}}$$

$$\cos(60-20) \qquad \sin(30-20)$$

$$\underset{1/2}{\cos 60}\cos 20 + \underset{\sqrt{3}/2}{\sin 60}\sin 20 \qquad \underset{1/2}{\sin 30}\cos 20 - \underset{\sqrt{3}/2}{\cos 30}\sin 20$$

۲ ✓

۸-

$$\begin{cases} \frac{1+\cos 2\alpha}{2} = \cos^2\alpha \\ \frac{1-\cos 2\alpha}{2} = \sin^2\alpha \\ \frac{1-\tan^2\alpha}{1+\tan^2\alpha} = \cos 2\alpha \end{cases} \longrightarrow \frac{\sin 20}{\cos 10} \times \cos 20 \times \cos 40 \times \frac{\sin 10 \times 8}{\sin 10 \times 8}$$

$$\longrightarrow \frac{\sin 80}{\sin 10 \times 8} = \frac{\cos 10}{\sin 10 \times 8} = \boxed{\frac{1}{8}\cot 10}$$

۲ ✓

۹-

$$A = 10\cos^2\alpha - 12\cos\alpha - 5 = ?$$

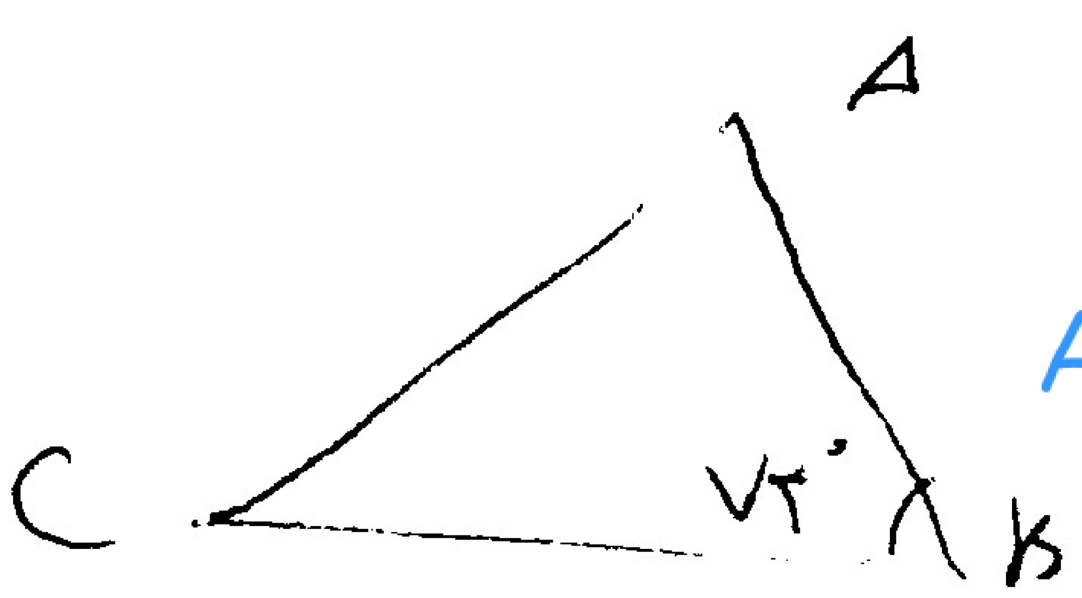
$$\therefore \quad 2 - 3\cos\alpha = \sin\alpha \xrightarrow{\text{توان ۲}} 4 + 9\cos^2\alpha - 12\cos\alpha = \sin^2\alpha = 1 - \cos^2\alpha$$

$$\longrightarrow 10\cos^2\alpha - 12\cos\alpha = -3$$

$$A = -3 - 5 = \boxed{-8}$$

۲ ✓

۱۰-



$$\sin B \sin C = \frac{1+\cos A}{2} \longrightarrow 2\sin B \sin C = 1 + \cos A \checkmark$$

$$A+B+C=\pi \quad A = \pi - (B+C)$$

$$2\sin B \sin C = 1 + \cos(\pi - (B+C))$$

$$2\sin B \sin C = 1 - \cos(B+C)$$

$$\rightarrow \sin B \sin C + \cos B \cos C = 1 \rightarrow \cos(B-C) = 1$$

$$\rightarrow B = C \rightarrow 180 - (72+72) = 36$$