۱۷٫۵

هلیا ابوطالبی

۱- $\tan(-2x+\frac{\pi}{4}) \Rightarrow -\tan(2x-\frac{\pi}{4}) \Rightarrow$

نقطه B: $\Rightarrow x=0 \Rightarrow \tan(-\frac{\pi}{4}) = -1$

۲

$A\ C = T = \frac{\pi}{2} = ?$

$$\frac{\frac{\pi}{2}\times|-1|}{2} = \frac{\pi}{4}$$

۲- $\frac{4}{9} - \frac{2}{3}\sin\alpha - \frac{1}{4}\cos^2\alpha = 0$

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$\frac{4}{9} - \frac{2}{3}\sin\alpha - \frac{1}{4}(1-\sin^2\alpha) = 0$

$\frac{4}{9} - \frac{2}{3}\sin\alpha - \frac{1}{4} + \frac{1}{4}\sin^2\alpha \xrightarrow{\times 36} \frac{1}{4}\sin^2\alpha - \frac{2}{3}\sin\alpha + \frac{7}{36} = 0$

$9\sin^2\alpha - 24\sin\alpha + 7 = 0$

$\sin^2 x - 24\sin\alpha + 63 = 0$

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

$\frac{21}{9} =$ غ ق ق و $\frac{3}{9} \leftarrow$ ق ق $\Rightarrow \sin^2 = \frac{1}{9}$

زیرا $\sin < |1|$

$1 - \sin^2 = \cos^2 = \frac{8}{9}$

$\Rightarrow \frac{1}{\cos^2} - 1 = \tan^2\alpha \Rightarrow \frac{9}{8}$

۳- $\log\frac{\sin\alpha}{-\cos\alpha} = \log 3 \Rightarrow \frac{\sin\alpha}{-\cos\alpha} = 3 = \tan\alpha = -3$

۲

$-\cos\alpha > 0 \Rightarrow \cos\alpha < 0$

$x^2 + 9x^2 = 1 \Rightarrow 10x^2 = 1 \Rightarrow x = \pm\frac{1}{\sqrt{10}}$

$\sin\alpha = \frac{3}{\sqrt{10}} \Leftarrow \cos\alpha = -\frac{1}{\sqrt{10}}$

$\sin\alpha - \cos\alpha = \frac{3}{\sqrt{10}} + \frac{1}{\sqrt{10}} = \frac{4}{\sqrt{10}}$

۴ـ

$\sin^4\theta - \sin^2\theta + 1 = \frac{4}{5}$

$\underbrace{\sin^2\theta(\sin^2\theta - 1)}_{-\cos^2\theta\sin^2\theta} = -\frac{1}{5}$ ۲

$\cos^4\theta + \cancel{\sin^2\theta} \quad 1 - \cos^2\theta$

$\underbrace{\cos^2\theta(\cos^2\theta - 1)}_{-\sin^2\theta\cos^2\theta} + 1 \qquad -\frac{1}{5} + 1 = \frac{4}{5}$

$\rightarrow -\frac{1}{5}$

۵ـ

$\frac{\sin x(3 + \cos x)}{2\left(\frac{1 - \cos x}{\sin^2 x}\right)}$ (۵

با توجه به اینکه مخرج همواره بزرگتر از ۰ بوده <=

<= صورت کوچکتر از صفر بوده است ، از آنجایی

که ۳ + cos x همواره + بوده $\sin x < 0$ بوده است

۲

$\frac{1}{\cos x}\left(\frac{\sin^2 x - 1}{\cos^2 x > 0}\right) > 0 \Rightarrow \cos x < 0$

ناحیه ۲ است

۶ـ

$\frac{2}{\sin x} = -\frac{3}{\cos x} \Rightarrow \frac{\cos x}{\sin x} = -\frac{3}{2}$ و

$\frac{\sin x}{\cos x} = -\frac{2}{3} \Rightarrow -\frac{3}{2} + -\frac{2}{3} = -\frac{13}{6}$ ۲

۷ – ۱,۵

$$\frac{\sqrt{1+\cos 40}}{\frac{\sin 50}{\cos 40}+\frac{\sin 10}{\cos 80}} \Rightarrow \frac{\sqrt{1+\cos 40}}{\cos 40+\cos^2 40-\underbrace{\sin^2 40}_{1-\cos^2 40}}$$

$$\frac{\sqrt{1+\cos 40}}{2\cos^2 40+\cos 40-1}$$

$$\underbrace{\cos^2 40+2\cos 40+1}_{(\cos 40+1)^2}+\underbrace{\cos^2 40-\cos 40-2}_{(\cos 40-2)(\cos 40+1)}$$

$$\frac{\sqrt{1+\cos 40}}{(\cos 40+1)(2\cos 40-1)}=\frac{\sqrt{2}\cos 20}{2\cos^2 20(2\cos^2 20-3)}=$$

$$2(\underbrace{\cos 40+1}_{\cos^2 20})-3$$

$$\frac{\sqrt{2}\cos 20}{(2\cos^2 20)(2\cos^2 20-3)}=\frac{\sqrt{2}}{2\cos 20(2\cos^2 20-3)}$$

$$\sin\alpha + 3\cos\alpha = 2$$ ۹-
$$\sin\alpha = 2 - 3\cos\alpha$$
$$\cos^2\alpha + \sin^2\alpha = 1$$
$$(2 - 3\cos\alpha)^2 + \cos^2\alpha \Rightarrow$$
$$4 + 9\cos^2\alpha - 12\cos\alpha + \cos^2\alpha = 1 \Rightarrow$$ ۲
$$10\cos^2\alpha - 12\cos\alpha + 4 = 1$$
$$10\cos^2\alpha - 12\cos\alpha = -3$$
$$5(2\cos^2\alpha - 1) - 12\cos\alpha \Rightarrow 10\cos^2\alpha - 5 - 12\cos\alpha$$
$$-3 - 5 = -8$$

$$2\sin\hat{B}\sin\hat{C} = 1 + \cancel{\cos A} - (\cos(\underbrace{\pi - A}_{B+C}))$$ ۱۰
$$2\sin\hat{C}\sin B = 1 - \cos B\cos C + \sin B\sin C \Rightarrow$$
$$1 = \cos B\cos C + \sin B\sin C$$ ۲
$$\cos(B - C) = 1 \Rightarrow$$
$$B - C = 0 \Rightarrow C = B = 72$$
$$72 \times 2 = 144 \qquad 180 - 144 = 36$$

$$\sqrt{1+\sin 50^\circ} = \sqrt{1+\cos 40^\circ} \xrightarrow[1+\cos 40^\circ = 2\cos^2 20^\circ]{\text{فرمول طلایی}} \sqrt{2\cos^2 20^\circ} = \sqrt{2}\,|\cos 20^\circ| = \sqrt{2}\cos 20^\circ$$ ۷
$$\sin 50^\circ + \sin 10^\circ = \sin(30^\circ + 20^\circ) + \sin(30^\circ - 20^\circ) =$$
$$\sin 30^\circ\cos 20^\circ + \sin 20^\circ\cancel{\cos 30^\circ} + \sin 30^\circ\cos 20^\circ - \cancel{\sin 20^\circ}\cos 30^\circ = 2\left(\tfrac{1}{2}\right)\cos 20^\circ = \cos 20^\circ$$
$$\frac{\sqrt{2}\cos 20^\circ}{\cos 20^\circ} = \boxed{\sqrt{2}}$$

سوال ۸

$$1-2\sin^2 5^\circ = \cos 10^\circ$$
$$2\cos^2 10 - 1 = \cos 20^\circ$$

فرمولهای

$$\cos(2\times 20^\circ) = \cos 40^\circ$$

$$\frac{1-\tan^2 20^\circ}{1+\tan^2 20^\circ} = \frac{\cos^2 20^\circ - \sin^2 20^\circ}{\underbrace{\cos^2 20 + \sin^2 20}_{1}} = \cos 40$$

$$\underbrace{(\sin 10)\ \cos 10}\times \cos 20 \times \cos 40 =$$

$$\frac{1}{2}\sin 20 \times \cos 20 \times \cos 40$$

$$\frac{1}{2}\times\frac{1}{2}\sin 40 \times \cos 40 =$$

$$\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\sin 80 = \frac{\frac{1}{8}\overset{\cot 10}{\sin 80}}{\sin 10} = \frac{1}{8}\cot 10$$