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«ریاضیات طباطبایی» به نام خداوند رنگین کمان - یازدهم دفتر B، تکلیف شماره 28

1)

(I) $\frac{1}{\sqrt{\cos^2\alpha}} - \frac{1}{\cot\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|}$, $\cot\alpha = \frac{\cos\alpha}{\sqrt{1-\cos^2\alpha}}$ (II)

$1-\cos^2\alpha = \sin^2\alpha$

II: $\frac{\cos\alpha}{\sin\alpha} = \frac{\cos\alpha}{|\sin\alpha|} \rightarrow \sin\alpha > 0$

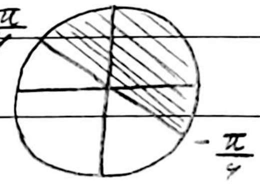
$\frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|} \rightarrow \cos\alpha > 0$

ناحیه‌ی اول مثلثاتی ← پاسخ نهایی

2)

$-\frac{\pi}{12} < x < \frac{5\pi}{12} \rightarrow -\frac{\pi}{6} < 2x < \frac{5\pi}{6} \rightarrow -\frac{1}{2} < \sin 2\pi \leq 1$

$-\frac{1}{2} < \frac{m-1}{4} \leq 1 \Rightarrow -2 < m-1 \leq 4 \rightarrow -1 < m \leq 5$ پاسخ نهایی



3)

$3\pi < 4x < 4\pi \Rightarrow \frac{3\pi}{4} < x < \pi \Rightarrow \sin 2x = -\frac{2}{3} \rightarrow 1+\sin(2x) = \frac{1}{3}$

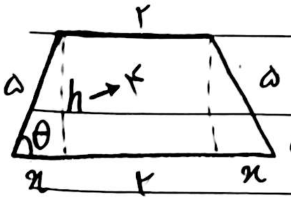
$= \cos^2 x + \sin^2 x + 2\sin x\cos x = \frac{1}{3} \Rightarrow (\sin x + \cos x)^2 = \frac{1}{3} \rightarrow \sin x + \cos x = \pm\frac{\sqrt{3}}{3}$

$\cos x + \sin x = -\frac{\sqrt{3}}{3}$ قبول

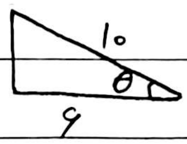
$\frac{1}{\sin^3 x + \cos^3 x} = \frac{1}{(\cos x + \sin x)(\sin^2 x + \cos^2 x + \sin x\cos x)}$

$\Rightarrow \frac{1}{\left(-\frac{\sqrt{3}}{3}\right)\left(\frac{4}{3}\right)} = \frac{-9}{4\sqrt{3}}$ پاسخ نهایی → $-0/75\sqrt{3}$

4)



$\cos\theta = \frac{6}{10}$



$\rightarrow x = 8$

$\cos\theta = \frac{6}{10} = \frac{?}{5} \rightarrow ? = 3$ $\sin\theta = \frac{8}{10} = \frac{?}{5} \rightarrow ? = 4$

$2+3+3=8$

$S = \frac{(8+2)\times 4}{2} = 20$ پاسخ نهایی

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5, $\tan(285^\circ)\tan(-165^\circ) - \sin(1095)\cos(255^\circ) = k\cos^2 15$

$\tan(\frac{3\pi}{2}+15)\times(-\tan(\pi-15)) - \sin(6\pi+15)\cos(\frac{3\pi}{2}-15)$

$= \underbrace{-\cot 15 \times \tan 15}_{-1} - \sin 15^\circ \times (-\sin 15^\circ) = -1+\sin^2 15 = -\cos^2 15^\circ$

$k\cos^2 15^\circ = -\cos^2(15^\circ) \rightarrow \boxed{k=-1}$

6, $\dfrac{\sqrt{3}\cos(210^\circ)\sin(243^\circ) - \sqrt{2}\sin(135^\circ)\cos(153^\circ)}{\cos 27^\circ} = A$

$\rightarrow \dfrac{\sqrt{3}\times(-\frac{\sqrt{3}}{2})\times\sin(\frac{3\pi}{2}-27) - \sqrt{2}(\frac{\sqrt{2}}{2})\times\cos(\pi-27)}{\cos 27^\circ}$

$\rightarrow \dfrac{-\frac{3}{2}\times(-\cos 27) - \frac{2}{2}\times(-\cos 27)}{\cos 27^\circ} = \dfrac{\frac{3}{2}\cos 27 + \cos 27}{\cos 27}$

$= \dfrac{\frac{5}{2}\cos 27^\circ}{\cos 27^\circ} = \boxed{\frac{5}{2}}$ پاسخ نهائی

7, $f(x) = 16 \times \frac{1+\cos 6x}{2} \times \frac{1+\cos 12x}{2} \times \frac{1+\cos 24x}{2} \times \frac{1+\cos 48x}{2}$

$\rightarrow f(x) = (1+\cos 6x)(1+\cos 12x)(1+\cos 24x)(1+\cos 48x)$

$\rightarrow f(\frac{\pi}{36}) = (1+\frac{\sqrt{3}}{2})(1+\frac{1}{2})(1-\frac{1}{2})(1-\frac{1}{2}) = \boxed{\frac{6+3\sqrt{3}}{16}}$ پاسخ نهائی

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8) $\frac{1-\sin x}{1+\sin x} = 4 \to 4+4\sin x = 1-\sin x \to 5\sin x = -3 \to \sin x = -\frac{3}{5}$

$\sin 2\alpha = \frac{2\tan\alpha}{1+\tan^2\alpha} \to \frac{2\tan\frac{x}{2}}{1+\tan^2\frac{x}{2}} = -\frac{3}{5} \to -10\tan\frac{x}{2} = 3+3\tan^2\frac{x}{2}$

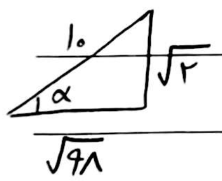
$\to 3\tan^2\frac{x}{2} - 10\tan\frac{x}{2} + 3 = 0 \xrightarrow{\times 3} (3\tan\frac{x}{2})^2 + 10(3\tan\frac{x}{2}) + 9 = 0$ پاسخ نهایی

عامل مشترک $\to (3\tan\frac{x}{2}+1)(3\tan\frac{x}{2}+9) \to \boxed{\tan\frac{x}{2} = -3, -\frac{1}{3}} \to$ مقدار صحیح ۳-

9) $\left\{\frac{\sin\theta}{1-\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = k\cot(\frac{\theta}{2})\right\} \to \frac{\sin x}{1+\cos x} = \frac{1-\cos x}{\sin x} = \tan(\frac{\alpha}{2})$

پاسخ نهایی $\boxed{k=2}$

$\Rightarrow \frac{1+\cos x}{\sin x} = \frac{\sin x}{1-\cos x} = \cot(\frac{\alpha}{2})$ $\quad \cot(\frac{\alpha}{2}) + \cot(\frac{\alpha}{2}) = 2\cot(\frac{\alpha}{2}) = k\cot(\frac{\alpha}{2})$

10) 

$\cos(\frac{11\pi}{4}+\alpha) = \cos(3\pi - \frac{\pi}{4} + \alpha) = \cos(3\pi - (\frac{\pi}{4} - \alpha))$

$\to -\cos(\frac{\pi}{4} - \alpha) = -(\cos\frac{\pi}{4}\cos\alpha - \sin\frac{\pi}{4}\sin\alpha)$

$\cos\alpha = \pm\frac{\sqrt{98}}{10}$

$\to -(\frac{\sqrt{2}}{2} \times -\frac{\sqrt{98}}{10} + \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{10}) = -(-\frac{12}{20}) = \boxed{\frac{3}{5}}$ پاسخ نهایی

NOTEBOOK