۳- درینا حسینی کلاس دوازدهم [illegible] A تکلیف شماره ۱۷

1

$8\cos x - \tan^2 x = 1 \longrightarrow 8\cos x = \underbrace{\tan^2 x + 1}_{\frac{1}{\cos^2 x}} \longrightarrow 8\cos^3 x = 1 \longrightarrow \cos^3 x = \frac{1}{8} \longrightarrow \cos x = \frac{1}{2}$

$\boxed{\frac{5\pi}{3} \text{ و } \frac{\pi}{3}}$

2

$5\sin^2 x + 2\cos(3x) = -2 \longrightarrow 5(1-\cos^2 x) + 2(4\cos^3 x - 3\cos x) = -2$

$5 - 5\cos^2 x + 8\cos^3 x - 6\cos x = -2$

3

$2\sin(x)\cos(2x) + \sin x = 1 \longrightarrow \sin x\,(\underbrace{2\cos 2x}_{2-4\sin^2 x} + 1) = 1 \longrightarrow \sin x\left(\frac{2-2\sin^2 x}{2\cos 2x}\right) = 1$

$\underbrace{2\sin x\cos x}_{\sin 2x} \times \cos x = 1$

4

$\frac{1}{\sin(\frac{\pi}{2}+2x)} + \frac{1}{\cos(\frac{\pi}{2}+4x)} = \frac{1}{\cos 2x} - \frac{1}{\underbrace{\sin 4x}_{2\sin 2x\cos 2x}} = \frac{1\times 2\sin 2x - 1}{\cos 2x \times 2\sin 2x}$

$\frac{2\sin 2x - 1}{2\sin 2x\cos 2x} = 0 \longrightarrow 2\sin 2x = 1 \longrightarrow \sin 2x = \frac{1}{2} \longrightarrow \sin 2x = \sin\frac{\pi}{6}$

$2x = 2k\pi + \frac{\pi}{6}$

$2x = 2k\pi + \pi - \frac{\pi}{6}$

$[0,\pi]$ در بازه $\longrightarrow \frac{5\pi}{6} - \frac{\pi}{6} = \frac{4\pi}{6} = \frac{2\pi}{3} \longrightarrow \tan 2x \times 150^\circ = \tan 120^\circ = \boxed{\sqrt{3}}$

5

$m(\cos x - \sin x) - 3\sqrt{6}(\sin 2x) = \sqrt{6} \longrightarrow \frac{m\times\sqrt{6}}{3} - 3\sqrt{6}\times\frac{1}{3} = \sqrt{6} \longrightarrow m\sqrt{6} = 3 + 3\sqrt{6}$

$m = \frac{3+3\sqrt{6}\times\sqrt{6}}{\sqrt{6}\times\sqrt{6}} = \frac{\sqrt{6}+6}{2}$

$\cos(x+\frac{\pi}{4}) = \frac{1}{\sqrt{3}}$

$\cos x\cos\frac{\pi}{4} - \sin x\sin\frac{\pi}{4} = \frac{\sqrt{2}}{2}(\cos x - \sin x) = \frac{1}{\sqrt{3}} \longrightarrow \cos x - \sin x = \frac{2}{\sqrt{6}} \xrightarrow{\text{توان ۲}} \underbrace{\sin^2 x + \cos^2 x}_{1} - \sin 2x = \frac{4}{6}$

$\sin 2x = \frac{1}{3}$

$\frac{2\sqrt{6}}{6} = \frac{\sqrt{6}}{3}$

6

$\sin\left(x+\overset{30}{\cancel{\frac{\pi}{6}}}\right)\underbrace{\cos\left(x-\overset{60}{\cancel{\frac{\pi}{3}}}\right)}_{\cos\left(\frac{\pi}{3}-x\right)}=1 \xrightarrow{\text{متمم هستند}} \sin\left(x+\frac{\pi}{6}\right)^2=1$

$\sin\left(x+\frac{\pi}{6}\right)=1=\sin\frac{\pi}{2}$

$\sin\left(x+\frac{\pi}{6}\right)=-1=\sin\frac{3\pi}{2}$

$x+\frac{\pi}{6}=2k\pi+\frac{\pi}{2} \longrightarrow x=2k\pi+\frac{\pi}{3}$

$x+\frac{\pi}{6}=2k\pi+\cancel{\pi}-\frac{\pi}{2}\ \left(\frac{\pi}{2}\right)$

$x+\frac{\pi}{6}=2k\pi+\frac{3\pi}{2} \longrightarrow x=2k\pi+\frac{4\pi}{3}$

$x+\frac{\pi}{6}=2k\pi+\underbrace{\cancel{\pi-\frac{3\pi}{2}}}_{-\frac{\pi}{2}} \longrightarrow x=2k\pi-\frac{2\pi}{3}$

$\boxed{\frac{\pi}{3} \text{ و } \frac{4\pi}{3}}$ ← ۲تا جواب دارد.

7

$\sin x+\sqrt{3}\cos x=\sqrt{2} \longrightarrow \sin x+\sqrt{3}\cos x=\frac{1}{|1|}\underbrace{\sqrt{1+3}}_{2}\sin\left(x+\frac{\pi}{3}\right)=\sqrt{2}$

$\sin\left(x+\frac{\pi}{3}\right)=\sin\frac{\pi}{4}$

$\tan a=\sqrt{3} \rightarrow \tan\frac{\pi}{3}=\sqrt{3}$

$x+\frac{\pi}{3}=2k\pi+\frac{\pi}{4} \longrightarrow x=2k\pi-\frac{\pi}{12}$ → ۲ جواب

$x+\frac{\pi}{3}=2k\pi+\underbrace{\pi-\frac{\pi}{4}}_{\frac{3\pi}{4}} \longrightarrow x=2k\pi+\frac{5\pi}{12}$

8

$4\sin x-\cos x\, x=1 \longrightarrow 4\sin x\cos x=-1 \longrightarrow 2\sin 2x=-1 \longrightarrow \sin 2x=-\frac{1}{2}$

$\sin 2x=\sin\left(-\frac{\pi}{6}\right)$

$2x=2k\pi-\frac{\pi}{6}$ → ۲تا جواب

$2x=2k\pi+\underbrace{\pi+\frac{\pi}{6}}_{\frac{7\pi}{6}}$

9

$\underbrace{(1+\cos 2\alpha)}_{2\cos^2\alpha}\underbrace{(1+\cos 4\alpha)}_{2\cos^2 2\alpha}\underbrace{(1+\cos 8\alpha)}_{2\cos^2 4\alpha}=\frac{1}{8} \longrightarrow 8(\cos\alpha\cos 2\alpha\cos 4\alpha)^2=\frac{1}{8}$

$\frac{\times\sin\alpha}{\times\sin\alpha}\ \cos\alpha\cos 2\alpha\cos 4\alpha=\frac{1}{8} \longrightarrow \frac{\left(\frac{1}{2}\sin 2\alpha\cos 2\alpha\right)\cos 4\alpha}{\sin\alpha}=\frac{1}{8} \longrightarrow \frac{\frac{1}{4}\sin 4\alpha\cos 4\alpha}{\sin\alpha}=\frac{1}{8}$

$\frac{\cancel{\frac{1}{8}}\sin 8\alpha}{\sin\alpha}=\cancel{\frac{1}{8}} \longrightarrow \sin 8\alpha=\sin\alpha$

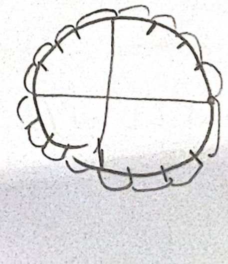
$8\alpha=2k\pi+\alpha \longrightarrow 7\alpha=2k\pi \longrightarrow \alpha=\frac{2k\pi}{7}$

$8\alpha=2k\pi+\pi-\alpha \longrightarrow \alpha=\frac{2}{9}k\pi+\frac{\pi}{9}$ → بررسی مخرج صفر π ها

10

$\tan(3x)\tan(x)=1 \longrightarrow \tan 3x=\cot x \longrightarrow \tan 3x=\tan\left(\frac{\pi}{2}-x\right)$

$\longrightarrow 3x=k\pi+\frac{\pi}{2}-x \longrightarrow 4x=k\pi+\frac{\pi}{2} \longrightarrow x=\frac{k\pi}{4}+\underbrace{\frac{\pi}{8}}_{22.5}$



→ ۸تا جواب

بازه [۳π و π]