پارمیس بنی زاده ، دوازدهم دختر B — تکلیف شماره ۱۷

۱) $8\cos x = 1 + \tan^2 x = \frac{1}{\cos^2 x} \Rightarrow 8\cos^3 x = 1$

$\cos^3 = \frac{1}{8}$ $\quad \cos = \frac{1}{2}$ $\quad x = \frac{\pi}{3} , \frac{5\pi}{3}$ دوجواب

۲) $5\sin^2(x) + 2\cos(3x) = 5\left(\frac{1-\cos 2x}{2}\right) + 2\cos 3x = -2$

$5 - 5\cos 2x + 4\cos 3x = (-4)$

$5\cos 2x - 4\cos 3x = 9 \Rightarrow \cos 3x = (-1) , \cos 2x = 1$

$\cos 2x = 1 \to x = k\pi \to \{-\pi , 0 , \pi\}$

$\cos 3x = -1 \to x = \{-\pi , \pi\}$

$\cap \to x = \{-\pi , \pi\}$ ۲جواب

۳) $2\sin x(1 - 2\sin^2 x) + \sin x = 1$

$2\sin x - 4\sin^3 x + \sin x = 3\sin x - 4\sin^3 x = 1$

$\sin 3x = 1 \qquad 3x = 2k\pi + \frac{\pi}{2}$

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

مجموع جواب $= \frac{\pi}{6} + \frac{5\pi}{6} + \frac{9\pi}{6} = \frac{5\pi}{2}$

۴) $\frac{1}{\sin(\frac{\pi}{2}+2x)} + \frac{1}{\cos(\frac{\pi}{2}+4x)} = \frac{1}{\cos 2x} + \frac{1}{-\sin 4x} = 0$

$\frac{\cos 2x - 2\sin 2x\cos 2x}{-\cos 2x \cdot \sin 4x} = \frac{\cancel{\cos 2x}(1 - 2\sin 2x)}{-\cancel{\cos 2x} \cdot \sin 4x} = 0$

$1 - 2\sin 2x = 0 \Rightarrow \sin 2x = \frac{1}{2}$

جواب های معادله در بازه $[0,\pi]$ $= \frac{\pi}{12} , \frac{5\pi}{12} \Longrightarrow \alpha = \frac{4\pi}{12} = \frac{\pi}{3}$

$\tan 2\alpha = \tan\frac{2\pi}{3} = -\sqrt{3}$

$$\cos\left(x+\frac{\pi}{4}\right)=\frac{\sqrt{2}}{2}\cos x-\frac{\sqrt{2}}{2}\sin x=\frac{1}{\sqrt{3}} \qquad (5$$

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

$$\xrightarrow{\text{توان ۲}} 1-2\sin x\cos x=\frac{2}{3}\Rightarrow \sin 2x=\frac{1}{3}$$

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

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

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

$$\cos\left(\frac{\pi}{3}-x\right)=\cos\left(x-\frac{\pi}{3}\right)\rightarrow \text{منفی خوان } \cos$$

$$\left(\cos\left(x-\frac{\pi}{3}\right)\right)^2=1 \qquad \cos\left(x-\frac{\pi}{3}\right)=\pm 1$$

$$\left.\begin{array}{l} x-\frac{\pi}{3}=2k\pi\rightarrow x=2k\pi+\frac{\pi}{3}\rightarrow\left\{\frac{\pi}{3}\right\} \\ x-\frac{\pi}{3}=2k\pi+\pi\rightarrow x=2k\pi+\frac{4\pi}{3}\rightarrow\left\{\frac{4\pi}{3}\right\}\end{array}\right\}\text{۲ جواب}$$

$$\text{معادله تقسیم بر ۲}\rightarrow \frac{1}{2}\sin x+\frac{\sqrt{3}}{2}\cos x=\frac{\sqrt{2}}{2} \qquad (7$$

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

$$x+\frac{\pi}{3}=2k\pi+\frac{\pi}{4}\rightarrow x=2k\pi-\frac{\pi}{12}\rightarrow\left\{-\frac{\pi}{12},\ \frac{23\pi}{12}\right\}$$

$$x+\frac{\pi}{3}=2k\pi+\frac{3\pi}{4}\rightarrow x=2k\pi+\frac{5\pi}{12}\rightarrow\left\{\frac{5\pi}{12}\right\}$$

$$-\frac{\pi}{12}+\frac{5\pi}{12}+\frac{23\pi}{12}=\frac{27\pi}{12}$$

$$4\sin x\cdot(-\cos x)=1\Rightarrow -2\sin 2x=1 \qquad (8$$

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

$$2x=2k\pi-\frac{\pi}{6}\rightarrow x=k\pi-\frac{\pi}{12}\rightarrow\left[\frac{11\pi}{12},\ \frac{23\pi}{12}\right\}$$

$$2x=2k\pi-\frac{5\pi}{6}\rightarrow x=k\pi-\frac{5\pi}{12}\rightarrow\left\{\frac{7\pi}{12},\ \frac{19\pi}{12}\right\}$$

$$\frac{11\pi}{12}+\frac{7\pi}{12}+\frac{19\pi}{12}+\frac{23\pi}{12}=5\pi$$

$$2\cos^2\alpha \cdot 2\cos^2 2\alpha \cdot 2\cos^2 4\alpha = \frac{1}{8}$$ (۹

کل عبارات را در $\sin^2\alpha$ ضرب، تقسیم می‌کنیم

$$2\sin^2\alpha\cos^2\alpha = \frac{1}{2}\sin^2 2\alpha \cdot 2\cos^2 2\alpha = \frac{1}{4}\sin^2 4\alpha$$

$$\frac{1}{4}\sin^2 4\alpha \cdot 2\cos^2 4\alpha = \frac{1}{8}\sin^2 8\alpha$$

$$\Rightarrow \frac{\frac{1}{8}\sin^2 8\alpha}{\sin^2\alpha} = \frac{1}{8} \Rightarrow \frac{\sin^2 8\alpha}{\sin^2\alpha} = 1 \Rightarrow \sin 8\alpha = \pm\sin\alpha$$

$\alpha \neq \pi, 0 \leftarrow \sin^2\alpha$

① $8\alpha = \alpha + 2k\pi \to \alpha = \frac{2}{7}k\pi \Rightarrow$ مقدار $\alpha_{max} = \frac{6\pi}{7}$

② $8\alpha = 2k\pi + \pi - \alpha \to 9\alpha = 2k\pi + \pi \Rightarrow$ مقدار $\alpha_{max} = \frac{7\pi}{9}$

③ $8\alpha = 2k\pi - \pi + \alpha \to 7\alpha = 2k\pi - \pi \Rightarrow$ مقدار $\alpha_{max} = \frac{5\pi}{7}$

④ $8\alpha = 2k\pi - \alpha \Rightarrow 9\alpha = 2k\pi \Rightarrow$ مقدار $\alpha_{max} = \frac{8\pi}{9}$

بیشترین عدد مجموعه A $= \frac{8\pi}{9}$

$$\tan 3x = \frac{1}{\tan x} = \cot x = \tan\left(\frac{\pi}{2} - x\right)$$ (۱۰

$$3x = k\pi + \frac{\pi}{2} - x \to 4x = k\pi + \frac{\pi}{2}$$

$$x = \frac{k\pi}{4} + \frac{\pi}{8} \to \left\{\frac{9\pi}{8}, \frac{11\pi}{8}, \frac{13\pi}{8}, \frac{15\pi}{8}\right\}$$

$$\frac{9\pi}{8} + \frac{11\pi}{8} + \frac{13\pi}{8} + \frac{15\pi}{8} = 6\pi$$