

جواب سوال (۲)

الف) $\sin^2 x - \cos^2 x = \sin 2x$

$(\sin^2 x - \cos^2 x) (\sin^2 x + \cos^2 x) = \sin 2x \rightarrow \sin 2x = -\cos 2x$
 -cos 2x

$\sin 2x = \cos(\pi - 2x) = \sin(\frac{\pi}{2} - (\pi - 2x)) = \sin(2x - \frac{\pi}{2})$

جواب ب) ① $2x = 2k\pi + 2x - \frac{\pi}{2} \Rightarrow x = k\pi - \frac{\pi}{4}$

② $2x = 2k\pi + \pi - (2x - \frac{\pi}{2}) \Rightarrow x = \frac{k\pi}{2} + \frac{\pi}{4}$

ب) $2\cos^2 x + 2\sin x \cos x = 1 \rightarrow 1 + \cos 2x + \sin 2x = 1 \rightarrow \cos 2x + \sin 2x = 0$
 $2(\frac{1+\cos 2x}{2}) \sin 2x$

$\rightarrow \sin 2x = -\cos 2x \xrightarrow{\div \cos 2x} \tan 2x = -1 = \tan(-\frac{\pi}{4})$

$2x = k\pi - \frac{\pi}{4} \Rightarrow x = \frac{k\pi}{2} - \frac{\pi}{8}$

کلن ۱۶

کلاس : دوازدهم و خترا A

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الف) $\cos 2x = 3\sin x - 1 \rightarrow 1 - 2\sin^2 x = 3\sin x - 1$

$2\sin^2 x + 3\sin x - 2 = 0 \rightarrow (\sin x - \frac{1}{2})(\sin x + 2)$

$\sin x = -2$ غیر قابل قبولی

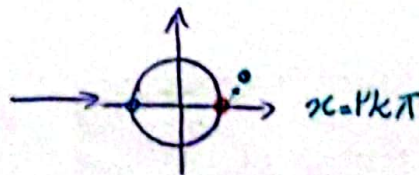
$\sin x = \frac{1}{2} \rightarrow 2k\pi + \frac{\pi}{6} \quad 2k\pi + \frac{5\pi}{6}$

ب) $\cos 2x + \cos x = 2$

این به معادله انتیم (OPT) به نام معروف است $a \sin^n \theta + b \cos^m \theta = C$ که اگر $C = |a| + |b|$ باشد.

$\cos x = 1 \rightarrow 2k\pi = x$

$\cos 2x = 1 \rightarrow k\pi = x$



جواب سوال ۴

۴

$$\left(\frac{\sin \frac{x}{y}}{1 + \cos \frac{x}{y}} = \frac{1}{\sin \frac{x}{y}} + \cot \frac{x}{y} \right) \Rightarrow \frac{\sin^2 \frac{x}{y}}{1 + \cos \frac{x}{y}} = 1 + \cos \frac{x}{y}$$

$$\frac{1 - \cos^2 \frac{x}{y}}{1 + \cos \frac{x}{y}} = 1 + \cos \frac{x}{y} \rightarrow y \cos^2 \frac{x}{y} + y \cos \frac{x}{y} = 0$$

$$\begin{cases} \cos \frac{x}{y} = 0 & \frac{\cos x = 0}{x = k\pi + \frac{\pi}{y}} \\ x = yk\pi + \pi & \text{①} \\ \cos \frac{x}{y} = -1 & \frac{\cos x = -1}{x = yk\pi + \pi} \\ x = yk\pi + \pi & \end{cases}$$

این توابع بازه $[-\pi, \frac{3\pi}{y}]$ جای نمیده

جواب ① $(yk\pi + \pi)$ توابع بازه $[-\pi, \frac{3\pi}{y}]$ دوتا جواب $-\pi$ و π رو میده

قدردمطلق صاف

$$|-\pi - (-\pi)| = 2\pi$$

$$|-\pi - \pi| = 2\pi \rightarrow 2\pi \rightarrow \text{جواب آخر}$$

$$\sqrt{1 + \sin 2x} = \sqrt{2} \cos 2x \xrightarrow{\text{توان}} 1 + \sin 2x = \frac{y \cos^2 2x}{y - y \sin^2 2x}$$

جواب سوال ۹

$$y \sin^2 2x + \sin 2x - 1 = 0$$

$$\sin 2x = -1 = \sin \frac{3\pi}{y} \rightarrow x \begin{cases} k\pi + \frac{3\pi}{y} \\ k\pi - \frac{\pi}{y} \end{cases} \rightarrow \text{توابع بازه } [0, \pi] \text{ میده } (\frac{3\pi}{y})$$

$$\sin 2x = \frac{1}{y} = \sin \frac{\pi}{y} \rightarrow x \begin{cases} k\pi + \frac{\pi}{y} \\ k\pi + \frac{5\pi}{y} \end{cases} \rightarrow \text{توابع بازه } [0, \pi] \text{ میده } (\frac{\pi}{y} \text{ و } \frac{5\pi}{y})$$

در مجموع معادله ۳ جواب داره! حالا سه تا جواب رو تو معادله اولی جای کنیم:

$$\text{① } \frac{3\pi}{y} \rightarrow \sqrt{1 + \sin \frac{3\pi}{y}} = \sqrt{2} \cos \frac{3\pi}{y} \rightarrow 0 = 0 \checkmark$$

$$\text{⑤ } \frac{\pi}{y} \rightarrow \sqrt{\frac{y}{y}} = \frac{\sqrt{y}}{y} \times$$

$$\text{③ } \frac{\pi}{y} \rightarrow \sqrt{\frac{y}{y}} = \frac{\sqrt{y}}{y} \checkmark$$

جواب آخر
دوتا جواب باقی قبول داریم

الف) $\cot x (\cos x + 1) = \frac{1}{\sin x} \rightarrow \cos x (\cos x + 1) = 1 \rightarrow$

$$\cos^2 x + \cos x - 1 = 0 \rightarrow \begin{cases} \cos x = -1 \rightarrow \boxed{x = k\pi + \pi} \\ \cos x = \frac{1}{2} \rightarrow \boxed{x = k\pi \pm \frac{\pi}{3}} \end{cases}$$

ب) $\sin^2 x + \cos^2 x - \sin x \cos x = 2 \xrightarrow{a=d} \sin^2 x + \cos^2 x - \sin x \cos x = 2(1 + \cos^2 x)$
 $\cot^2 x + \cot x = 0 \rightarrow \cot x (\cot x + 1) = 0$

$$\rightarrow \begin{cases} \cot x = 0 \rightarrow \boxed{x = k\pi + \frac{\pi}{2}} \\ \cot x = -1 \rightarrow \boxed{x = k\pi - \frac{\pi}{4}} \end{cases}$$

عین بنی

الف) $\sin^2 x - \cos^2 x = 1$

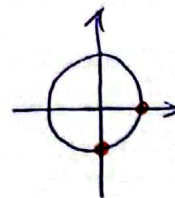
$$\left\{ \begin{array}{l} x = \frac{\pi}{2} \rightarrow x = k\pi + \frac{\pi}{2} \\ x = -\frac{\pi}{2} \rightarrow x = k\pi - \frac{\pi}{2} \end{array} \right\} \rightarrow k\pi + \frac{\pi}{2}$$

جواب ها: $\frac{\pi}{2}, \frac{3\pi}{2}$



ب) $\sin^2 x - \cos^2 x = -1$

$$\left\{ \begin{array}{l} 0, \pi = x \rightarrow x = k\pi \\ -\frac{\pi}{2} = x \rightarrow x = k\pi - \frac{\pi}{2} \end{array} \right\} \rightarrow$$



جواب ها: $0, \pi, \frac{3\pi}{2}$

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

جواب سوال ۵

$$\cos^2 x + 1 + \frac{\cos^2 x - 1}{2} - \cos^2 x = 1 \rightarrow \cos^2 x = 0 \rightarrow \cos^2 x = 0$$

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

جواب سوال ۷

مساده سازی معادله

$$\cos^3 x - \sin^2 x \cos^3 x = 1 \rightarrow -\sin^2 x \cos^3 x = \underbrace{1 - \cos^3 x}_{\leftarrow \sin^2 x} \rightarrow$$

$$-\sin^2 x (\cos^3 x + 1) = 0 \Rightarrow \begin{cases} \sin^2 x = 0 \rightarrow \text{دربازه } [0, 2\pi] \leftarrow \text{صفر} - \pi - 2\pi \\ \cos^3 x = -1 \Rightarrow \end{cases}$$

$$\cos^3 x = -1 \Rightarrow 3x = 2k\pi + \pi \Rightarrow x = \frac{2k\pi}{3} + \frac{\pi}{3} \quad \begin{matrix} \text{جواب ها در} \\ [0, 2\pi] \end{matrix}$$

$$\frac{\pi}{3}, \pi, \frac{5\pi}{3} \leftarrow \text{در کل معادله ۳ جواب دارد} \leftarrow \left\{ \frac{\pi}{3}, 0, \frac{\pi}{3}, \pi, \frac{5\pi}{3} \right\}$$

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