

15,5

فصل اول سرفه - کالیب - 14 دوازدهم دفتر A

$$-2\sin^2 x + 1$$

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

$$\sin x = -2 \times \times \text{و ج}$$

$$\sin x = \frac{1}{2} \checkmark \checkmark \rightarrow$$

$$\sin x = \sin \frac{\pi}{6} \begin{cases} \textcircled{1} x = 2k\pi + \frac{\pi}{6} \\ \textcircled{2} x = 2k\pi + \pi - \frac{\pi}{6} = 2k\pi + \frac{5\pi}{6} \end{cases}$$

مستند ؟

$$\textcircled{2} \frac{\sin^2 x - \cos^2 x}{\sin^2 x - \cos^2 x} = \sin^2 x \rightarrow -\cos^2 x = \sin^2 x \rightarrow \textcircled{1} x - \frac{\pi}{2} = 2k\pi + \frac{\pi}{2} \rightarrow -x = 2k\pi + \frac{\pi}{2} + \frac{\pi}{2}$$

مستند ؟

$$\begin{aligned} \hookrightarrow x &= -k\pi - \frac{\pi}{2} \\ \textcircled{2} x - \frac{\pi}{2} &= 2k\pi + \pi - \frac{\pi}{2} \rightarrow 4x = 2k\pi + \frac{3\pi}{2} \\ \hookrightarrow x &= \frac{k\pi}{2} + \frac{3\pi}{4} \end{aligned}$$

$$\textcircled{3} \frac{\cos x}{\sin x} (2\cos x + 1) = \frac{1}{\sin x} \rightarrow 2\cos^2 x + \cos x - 1 = 0 \rightarrow \cos x = -1 \text{ و ج}$$

$$\hookrightarrow \cos x = \frac{1}{2} \rightarrow x = 2k\pi \pm \frac{\pi}{3}$$

$$\hookrightarrow 2\sin^2 x - \sin x \cos x + \cos^2 x = 1 \rightarrow \sin^2 x - \sin x \cos x = 1 \rightarrow \sin^2 x - 1 = \sin x \cos x \rightarrow \sin x (-1) = \sin x \cos x$$

$$x = k\pi \pm \frac{\pi}{2}$$

$$\textcircled{4} \cos\left(\frac{\pi}{2} + x\right) \cos\left(x - \frac{\pi}{2}\right) = \frac{1}{2} \rightarrow \frac{1}{x} \sin\left(\frac{\pi}{2} + x\right) \frac{1}{x} \rightarrow \cos x = \frac{1}{2}$$

$$\cos x = \cos \frac{\pi}{3} \rightarrow x = 2k\pi \pm \frac{\pi}{3} \rightarrow x = k\pi \pm \frac{\pi}{3}$$

$$\hookrightarrow \cos\left(x - \frac{\pi}{4}\right) = -\sin x \rightarrow \textcircled{1} x - \frac{\pi}{4} = 2k\pi + \frac{\pi}{2} + x \text{ و ج}$$

$$\cos\left(\frac{\pi}{4} + x\right) \textcircled{2} x - \frac{\pi}{4} = 2k\pi - \frac{\pi}{4} - x \rightarrow 2x = 2k\pi - \frac{\pi}{2} \rightarrow x = k\pi - \frac{\pi}{4}$$

$$\textcircled{5} \frac{\sin x + \sin x}{\sin x} - \sin^2 x = \cos^2 x \rightarrow \sin^2 x + \cos^2 x = 1 \rightarrow \sin^2 x + \sin^2 x = \sin^2 x \rightarrow \sin^2 x = 0$$

$$\sin x = 0 \rightarrow x = k\pi \rightarrow \frac{k\pi}{2} + \frac{\pi}{2}$$

مستند ؟

$$\textcircled{4} \frac{\sin \frac{x}{r}}{1 + \cos \frac{x}{r}} = \frac{1}{\sin \frac{x}{r}} + \cot \frac{x}{r} \rightarrow \frac{\sin \frac{x}{r}}{1 + \cos \frac{x}{r}} = \frac{1 + \cos \frac{x}{r}}{\sin \frac{x}{r}} \rightarrow \cancel{\sin \frac{x}{r}} = \cos^2 \frac{x}{r} + \cancel{r \cos \frac{x}{r}} + \cancel{r \cos \frac{x}{r}} + \cancel{\sin \frac{x}{r}}$$

$$\cos^2 \frac{x}{r} + \sin^2 \frac{x}{r} \quad \textcircled{1,0}$$

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

$$\rightarrow \cos \frac{x}{r} = -1 \quad \text{OJZ}$$

$$\rightarrow r \cos \frac{x}{r} = - \rightarrow \cos \frac{x}{r} = \cos \frac{\pi}{r} \rightarrow \frac{x}{r} = r k \pi \pm \frac{\pi}{r} \rightarrow x = \varepsilon k \pi \pm \pi$$

$$\text{مثال: } \{ \pi, -\pi \} \rightarrow | \pi - (-\pi) | = 2\pi$$

$$\textcircled{5} \cos^2 x - \sin^2 x \cos^2 x = \cos^2 x + \sin^2 x \rightarrow \sin^2 x (1 + \cos^2 x) = \begin{cases} \textcircled{1} \sin^2 x = \sin^2 x \\ \textcircled{2} \cos^2 x = \cos^2 x \end{cases}$$

$$\textcircled{1} \rightarrow x = r k \pi + \pi, x = r k \pi + \pi$$

$$\textcircled{2} \rightarrow r x = r k \pi \pm \pi \rightarrow \frac{r k \pi}{r} \pm \frac{\pi}{r} = x \quad \checkmark$$

$$! \text{ جواب هار } [0, 2\pi] \quad \textcircled{1,0}$$

$$\textcircled{6} \frac{1 + \tan x}{1 + \tan x} = \tan^2 x \rightarrow \frac{\cos x - \sin x}{\cos x} = \frac{\sin^2 x}{\cos^2 x} \Rightarrow \cos^2 x \cos x - \cos^2 x \sin x = \sin^2 x \cos x + \sin^2 x \sin x$$

$$\rightarrow \cos^2 x \cos x - \sin^2 x \sin x = \cos^2 x \sin x + \sin^2 x \cos x \Rightarrow \varepsilon x = r k \pi \pm \left(x - \frac{\pi}{r} \right)$$

$$\sin \varepsilon x = \cos \left(\varepsilon x - \frac{\pi}{r} \right)$$

$$\varepsilon x = r k \pi - \varepsilon x + \frac{\pi}{r} \rightarrow 2x = r k \pi + \frac{\pi}{r} \rightarrow x = \frac{r k \pi}{2} + \frac{\pi}{2r}$$

$$\textcircled{7} \sqrt{1 + \sin^2 x} = \sqrt{2} \cos x \rightarrow \cos x + \sin^2 x = \sqrt{2} \cos x - \sqrt{2} \sin^2 x$$

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

$$\textcircled{1}$$

$$\left\{ \frac{r\pi}{r}, \frac{\pi}{r} \right\} : \text{جواب هار}$$

$$\textcircled{10} \text{ ا) } \sin^2 x - \cos^2 x = 1 \rightarrow \sin^2 x - \cos^2 x = 1 \rightarrow -\cos^2 x = 1 \rightarrow \cos^2 x = -1 \rightarrow r x = r k \pi \pm \pi \rightarrow x = k \pi \pm \frac{\pi}{r}$$

$$\text{ب) } \sin^2 x - \cos^2 x = -1 \xrightarrow{\text{مثال}} \cos^2 x = 1 \rightarrow \cos x = 1 \rightarrow x = r k \pi \pm \pi$$

$$\textcircled{1,0}$$

$$\xrightarrow{\text{مثال}} \sin^2 x = -1 \rightarrow \sin x = -1 \rightarrow x = k\pi + \frac{3\pi}{r} \leq k\pi - \frac{\pi}{r}$$

$$\left\{ \frac{r\pi}{r}, \dots, \pi \right\} : \text{جواب هار}$$

سوال ۱۰ در معادلات به فرم $\pm \sin^n x \pm \cos^n x = 1$ یا -1 فقط کافی است که با محور ۱
جواب بکنی!

$$\sin^4 x - \cos^4 x = 1$$



$$x = k\pi \text{ یا } 0$$

$$x = \frac{3\pi}{2}$$

$$\sin^4 x - \cos^4 x = 1$$



$$x = \frac{\pi}{2}$$

$$x = \frac{3\pi}{2}$$

الف ۱

سوال ۹

$$\sqrt{1 + \sin x} = \sqrt{2} \cos x \xrightarrow{\text{توان ۲}} 1 + \sin x = 2 \cos^2 x$$

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

$$\sin x = -1 \rightarrow x = k\pi - \frac{\pi}{2} \xrightarrow{\begin{matrix} 0 \leq x < 2\pi \\ k \in \mathbb{Z} \end{matrix}} x = \frac{3\pi}{2}$$

$$\sin x = \frac{1}{2} \rightarrow x = k\pi + \frac{\pi}{6} \text{ یا } x = k\pi + \frac{5\pi}{6} \xrightarrow{\begin{matrix} 0 \leq x < 2\pi \\ k \in \mathbb{Z} \end{matrix}} x = \frac{\pi}{6} \text{ یا } \frac{5\pi}{6}$$

چون عبارت به توان ۲ رسیده است جواب را باید زائد تولید کردند
به ازای $\cos x = \frac{1}{2}$ $x = \frac{\pi}{3}$ و $x = \frac{5\pi}{3}$ منفرجه پس جواب را باید از این دو عبارت

۵ معادله ۲ جواب دارد

سوال ۷

$$\cos^2 x - \sin^2 x \cos^4 x = 1 \xrightarrow{\cos^2 x = 1 - \sin^2 x}$$

$$1 - \sin^2 x - \sin^2 x \cos^2 x = 1 \rightarrow \sin^2 x (1 + \cos^2 x) = 0 \rightarrow \sin x = 0$$

$$\sin x = 0 \rightarrow x = k\pi \rightarrow x = 0, \pi, 2\pi$$

$$\cos^2 x = 1 \rightarrow x = k\pi + \pi \rightarrow x = \frac{k\pi + \pi}{2} \rightarrow x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}$$

معادله ۵ جواب دارد

$$\begin{cases} r \cos \alpha + r \sin \alpha \cdot \sin \alpha < 1 \\ r \sin \alpha \cos \alpha = \sin \alpha r \end{cases} \quad \left| \frac{1 + \cos \alpha}{r} = \cos \alpha \right.$$

سوال ۲ قمت ب

$$1 + \cos \alpha + \sin \alpha < 1 \rightarrow \cos \alpha + \sin \alpha = 0$$

$$\tan \alpha = -1 \rightarrow \alpha = k\pi - \frac{\pi}{4} \rightarrow x = \frac{k\pi}{r} - \frac{\pi}{r}$$

$$1 + \cos \alpha = r \cos \alpha$$

$$\cos \alpha + \cos \alpha = r$$

سوال ۱ قمت ب؟

$$r \cos \alpha + \cos \alpha = r \rightarrow \cos \alpha = 1 \rightarrow x = k\pi$$

$$\hookrightarrow \cos \alpha = -\frac{r}{r} x$$

$$\frac{\sin \frac{\pi}{r}}{1 + \cos \frac{\pi}{r}} = \tan \frac{\pi}{r}$$

سوال ۴

$$\frac{1}{\sin \frac{\pi}{r}} + \cot \frac{\pi}{r} = \frac{1 + \cos \frac{\pi}{r}}{\sin \frac{\pi}{r}} = \frac{1}{\tan \frac{\pi}{r}} = \cot \frac{\pi}{r}$$

$$\tan \frac{\pi}{r} = \cot \frac{\pi}{r} \rightarrow \tan \frac{\pi}{r} = \tan \left(\frac{\pi}{r} - \frac{\pi}{r} \right)$$

$$\frac{\pi}{r} = k\pi + \frac{\pi}{r} - \frac{\pi}{r} \rightarrow \frac{\pi}{r} = k\pi + \frac{\pi}{r} \rightarrow x = k\pi + \pi$$

$$\text{جوابها} \quad \hookrightarrow k=0 \rightarrow x=\pi$$

$$\hookrightarrow k=-1 \rightarrow x=-\pi \rightarrow \text{فاصله} = |\pi - (-\pi)| = 2\pi$$