

11/5

دنيا محمد - دافهم جبه

الف) $\cos 2x = 3 \sin x - 1$

سوال 11/5

$\rightarrow \cos 2x = 1 - 2 \sin^2 x \rightarrow 2 \sin^2 x + 3 \sin x - 2 = 0$

$\sin x = \frac{-3 \pm \sqrt{33}}{4}$ $\rightarrow \sin x = -\frac{1}{2}$
 $\sin x = \frac{1}{2}$ ✓

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

ب) $\cos 2x + \cos x - 2 = 0$

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

$\Rightarrow 2 \cos^2 x + \cos x - 3 = 0 \rightarrow \cos x = \frac{-1 \pm \sqrt{25}}{4}$
 $\cos x = 1 \rightarrow x \in 2k\pi$ ✓
 $\cos x = -\frac{3}{2}$ ✗

(2 سوال)

الف) $\sin^2 x - \cos^2 x = \sin x$

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

$\rightarrow \frac{\sin^2 x}{2 \sin^2 x \cos^2 x} = -\cos 2x \rightarrow \frac{1}{2 \sin^2 x \cos^2 x} = -\cos 2x$
✓ $\sin 2x = -\frac{1}{2}, \cos 2x = 0$

$x \in k\pi + \frac{\pi}{2} \rightarrow x \in k\pi + \frac{\pi}{2}$

$x \in k\pi + \pi - \frac{\pi}{2} = k\pi + \frac{3\pi}{2} \rightarrow x \in k\pi - \frac{\pi}{2}$ ✓

$x \in k\pi \pm \frac{\pi}{2} \rightarrow x \in k\pi \pm \frac{\pi}{2}$

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$$ب) \frac{r \cos^2 x}{1 + \cos^2 x} + \frac{r \sin x \cos x}{\sin^2 x} = 1$$

$$\cancel{r \sin^2 x} \quad 1 + \cos^2 x + \sin^2 x = 1 \rightarrow \sin^2 x + \cos^2 x = 0$$

$$\cos^2 x = -\sin^2 x$$

$$r_x \rightarrow r_x \in \left(k\pi + \frac{\pi}{\varepsilon} \right) \rightarrow x \in k\pi + \frac{\pi}{\varepsilon}$$

$$\rightarrow r_x \in \left(k\pi + \frac{\pi}{\varepsilon} \right) \rightarrow x \in k\pi + \frac{\pi}{\varepsilon}$$

$$الف) \cot x (r \cos x + 1) = \frac{1}{\sin x} \quad \text{سوال 13}$$

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

$$\sin x \neq 0 \quad \cos x = \frac{-1 \pm \sqrt{1 - 4r}}{2} \rightarrow \cos^2 x = \frac{1 - 4r}{4}$$

$$\cos x = \frac{1}{r} \rightarrow x = k\pi \pm \frac{\pi}{r} \quad \leftarrow \sin = 0 \quad \leftarrow \text{كثير قبل قبل}$$

$$ب) r \sin^2 x - \sin x \cos x + \cos^2 x = r$$

$$\sin^2 x + \cos^2 x + \sin^2 x - \sin x \cos x = r$$

$$\rightarrow \cancel{\sin^2 x} - \sin \cos x = \cancel{\sin^2 x} + \cos^2 x$$

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

$$\cos x = 0 \quad \rightarrow \sin x = -\cos x$$

$$x \rightarrow x \in k\pi \pm \frac{\pi}{r}$$

$$x \rightarrow x \in k\pi + \frac{\pi}{\varepsilon}$$

$$x \rightarrow x \in k\pi + \frac{\pi}{\varepsilon}$$

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الف) $\cos\left(\frac{\pi}{2} + x\right) \cos\left(x - \frac{\pi}{2}\right) = \frac{1}{r}$

سوال ۱۴

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

از زاویه مستقیم به سمت اکسیدیم

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

$\rightarrow \cos 2x = \frac{1}{r}$

$2x \in k\pi \pm \frac{\pi}{2} \rightarrow x \in k\pi \pm \frac{\pi}{4}$

ب) $\cos\left(2x - \frac{\pi}{a}\right) = -\sin 2x$

$\cos\left(2x - \frac{\pi}{a}\right) = \sin(-2x) = \cos\left(2x + \frac{\pi}{2}\right)$

$2x - \frac{\pi}{a} = k\pi + \frac{\pi}{2} + 2x \rightarrow \times$

$2x - \frac{\pi}{a} = k\pi - \frac{\pi}{2} - 2x \rightarrow x \in \frac{k\pi}{2} - \frac{\sqrt{a}}{\sqrt{2}}$

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

سوال ۱۵

$\rightarrow \frac{r \sin 2x \cos 2x + \sin 2x}{\sin 2x} = r \cos 2x + 1$

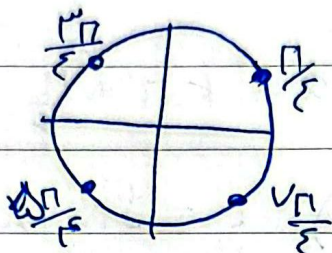
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$\rightarrow r \cos 2x + 1 = 1 \rightarrow r \cos 2x = 0 \rightarrow \cos 2x = 0$
 $2x \in k\pi \pm \frac{\pi}{2}$

$$\frac{\sin \frac{x}{r}}{1 + \cos \frac{x}{r}} = \frac{1}{\sin \frac{x}{r}} + \cot \frac{x}{r} \left[-\pi, \frac{3\pi}{r} \right] \quad (\text{حل})$$

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

$$\tan \frac{x}{r} = \pm 1$$



$$\tan \frac{x}{r} = \pm 1$$

$$\frac{x}{r} \in k\pi \pm \frac{\pi}{4}$$

$$\left. \begin{aligned} x \in 2k\pi \pm \pi \\ -\pi \leq x \leq \frac{3\pi}{r} \end{aligned} \right\} x = -\pi, \pi$$

→ $\pi = 2\pi$

$$\cos^2 x - \sin^2 x \cos^2 x = 1 \quad [0, \pi] \quad (\text{حل})$$

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

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

$\swarrow \quad \searrow$
 $\sin x = 0 \quad \cos^2 x = 1$

$$x \rightarrow x \in [0, \pi]$$

$$\rightarrow x \in 2k\pi \pm \pi \rightarrow x \in \frac{2k\pi}{r} \pm \frac{\pi}{r}$$

حالات $[0, \pi]$ → $0, \pi, 2\pi, \frac{\pi}{r}, \frac{2\pi}{r}$

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$$\frac{1 - \tan x}{1 + \tan x} = \tan^3 x$$

سوال 18

$$\rightarrow \frac{\tan \frac{\pi}{4} - \tan x}{1 + (\tan \frac{\pi}{4} \times \tan x)} = \tan^3 x$$

1, 1, 1

$$\rightarrow \tan\left(\frac{\pi}{4} - x\right) = \tan^3 x \rightarrow x = k\pi + \frac{\pi}{4} - x$$

$$\rightarrow x = \frac{k\pi}{2} + \frac{\pi}{8}$$

$$\text{سوال 19} \quad \frac{\sin^4 x - \cos^4 x}{-\cos^2 x} = 1 \quad [0, \pi] \rightarrow -\cos^2 x = 1 \rightarrow \cos^2 x = -1$$

$$\rightarrow x \in [0, \pi] \rightarrow x \in k\pi \pm \frac{\pi}{2} \rightarrow \left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$$

* مقادیر مختلف را امتحان کنید

$$\text{ب) } \sin^4 x - \cos^4 x = -1$$

$$x = 0 \rightarrow 0 - 1 = -1 \checkmark$$

$$x = \pi \rightarrow 0 - (-1) = 1 \neq -1 \times$$

$$x = \frac{\pi}{2} \rightarrow 1 - 0 = 1 \neq -1 \times$$

$$x = \frac{3\pi}{2} \rightarrow -1 - 0 = -1 \checkmark$$

$$x = \pi \rightarrow 0 - 1 = -1 \checkmark$$

$$0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$$

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سوال 9

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

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

$$\sin 2x = -1 \rightarrow 2x = 2k\pi - \frac{\pi}{2} \xrightarrow[k \in \mathbb{Z}}{0 \leq x \leq \pi} x = \frac{3\pi}{4} \checkmark$$

$$\hookrightarrow \sin 2x = +\frac{1}{2}$$

$$\sin 2x = \frac{1}{2} \rightarrow 2x = 2k\pi + \frac{\pi}{6} \leq 2k\pi + \frac{5\pi}{6} \xrightarrow[k \in \mathbb{Z}}{0 \leq x \leq \pi} x = \frac{\pi}{12} \leq \frac{5\pi}{12} \checkmark$$

چون عبارت به توان 2 رسیده است جواب زاویه تولید میکنند
به ازای $\cos 2x = \frac{5\pi}{12}$ منفر مر شود به چن جواب را ایالات میزد است

* معادله 2 جواب دارد