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(14)

باران نسایی دوازدهم دخترب

$$\text{الف) } \cos^2 x = \sqrt{2} \sin x - 1$$

-1

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

$$\sqrt{2} \sin^2 x + \sqrt{2} \sin x - \sqrt{2} = 0 \xrightarrow{\text{عوض}} t^2 + \sqrt{2}t - \sqrt{2} = 0$$

$$(t + \sqrt{2})(t - 1) = 0$$

$$\sin x = -\sqrt{2}$$

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

$$\sin x = \sin \frac{\pi}{4}$$

$$x = 2K\pi + \frac{\pi}{4}$$

$$x = 2K\pi + \pi - \frac{\pi}{4} \rightarrow x = 2K\pi + \frac{3\pi}{4}$$

$$\text{ب) } \cos^2 x + \cos x - \sqrt{2} = 0$$

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

$$\sqrt{2} \cos^2 x + \cos x - \sqrt{2} = 0$$

$$\cos x = 1 \checkmark$$

$$\cos x = \frac{\sqrt{2}}{\sqrt{2}} x$$

$$\cos x = \cos \pi$$

$$x = 2K\pi$$

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$$\text{الف) } \sin^E x - \cos^E x = \sin^E x$$

-P

$$\underbrace{(\sin^P x + \cos^P x)}_1 \underbrace{(\sin^P x - \cos^P x)}_{-\cos^P x} = \sin^E x$$

$$-\sin\left(\frac{\pi}{P} - Px\right) = \sin^E x \rightarrow \sin^E x = \sin\left(Px - \frac{\pi}{P}\right)$$

$$Px = PK\pi + Px - \frac{\pi}{P} \rightarrow Px = PK\pi - \frac{\pi}{P} \rightarrow x = K\pi - \frac{\pi}{P}$$

$$Ex = PK\pi + \pi - Px + \frac{\pi}{P} \rightarrow Ex = PK\pi + \frac{P\pi}{P} \rightarrow x = \frac{K\pi}{P} + \frac{\pi}{P}$$

$$\text{ب) } P\cos^P x + P\sin x \cos x = 1$$

$$P\sin x \cos x = \underbrace{1 - \cos^P x}_{\sin^P x} - \cos^P x$$

$$\rightarrow \sin^P x = -\cos^P x \xrightarrow{\div \cos^P x} \tan^P x = -1$$

$$Px = K\pi - \frac{\pi}{P} \rightarrow x = \frac{K\pi}{P} - \frac{\pi}{P}$$

۳- غیر قابل قبول (سینوس x نباید صفر شود)

$$\text{الف) } \cot x (2 \cos x + 1) = \frac{1}{\sin x}$$

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

$\sin x \neq 0$

$$\cos x = -1$$

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

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

$$\text{ب) } \cancel{2 \sin^2 x} - \sin x \cos x + \cos^2 x = 2$$

$$\downarrow \cancel{2 \sin^2 x} + 2 \cos^2 x$$

$$-\sin x \cos x - \cos^2 x = 0$$

$$-\cos x (\sin x + \cos x) = 0$$

$$\sin x = -\cos x$$

$$\xrightarrow{\div \cos x} \tan x = -1$$

$$x = K\pi - \frac{\pi}{4}$$

$$\cos x = 0 \rightarrow x = 2K\pi + \frac{\pi}{2}$$

$$\tan x = -1 \rightarrow x = K\pi - \frac{\pi}{4}$$

PITICO

$$\text{ا) } \cos\left(\frac{\pi}{r} + x\right) \cos\left(x - \frac{\pi}{r}\right) = \frac{1}{r} \quad -r$$

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

$$\frac{1}{r} \sin\left(rx - \frac{\pi}{r}\right) = \frac{-1}{r} \rightarrow \sin\left(rx - \frac{\pi}{r}\right) = \frac{-1}{r}$$

$$-\cos rx = \frac{-1}{r} \rightarrow \cos rx = \frac{1}{r}$$

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

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

$$\cos rx \cos \frac{\pi}{a} + \sin rx \sin \frac{\pi}{a} = -\sin rx$$

$$\frac{\div \cos rx}{\cos rx \neq 0} \cos \frac{\pi}{a} + \tan rx \sin \frac{\pi}{a} = -\tan rx$$

$$\cos \frac{\pi}{a} = -\tan rx \sin \frac{\pi}{a} - \tan rx$$

$$-\tan rx (\sin \frac{\pi}{a} + 1)$$

$$-\tan rx = \frac{\cos \frac{\pi}{a}}{\sin \frac{\pi}{a} + 1} \xrightarrow{\arctan} rx = \arctan\left(\frac{-\cos \frac{\pi}{a}}{\sin \frac{\pi}{a} + 1}\right) + k\pi$$

$$\rightarrow x = \frac{1}{r} \arctan\left(\frac{-\cos \frac{\pi}{a}}{\sin \frac{\pi}{a} + 1}\right) + \frac{k\pi}{r}$$

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$$\frac{\sin kx + \sin rx}{\sin rx} - \sin^r x = \cos^r x \quad - (1)$$

$$\frac{\sin kx + \sin rx}{\sin rx} = 1 \rightarrow \frac{\sin kx + \sin rx}{\sin rx} - 1 = 0$$

$$\frac{\sin kx}{\sin rx} = 0 \rightarrow \sin kx = 0$$

$\sin rx \neq 0$

$$kx = k\pi \rightarrow x = \frac{k\pi}{F}$$

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$$\frac{\sin \frac{x}{r}}{1 + \cos \frac{x}{r}} = \frac{1}{\sin \frac{x}{r}} + \cot \frac{x}{r} \quad - 9$$

$$\frac{\sin \frac{x}{r}}{1 + \cos \frac{x}{r}} = \frac{1 + \cos \frac{x}{r}}{\sin \frac{x}{r}} \quad \sin \frac{x}{r} \neq 0$$

$$1 + \cos \frac{x}{r} \neq 0$$

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

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

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

$$1 - \cos^r \frac{x}{r} = 1 + \cos \frac{x}{r}$$

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

$$[-1, \frac{3\pi}{r}] \rightarrow \cos \frac{x}{r} = 0 \rightarrow \frac{x}{r} = \frac{-\pi}{r}, \frac{\pi}{r}, \frac{3\pi}{r}$$

$$\cos \frac{x}{r} = -1 \rightarrow \text{غير بد قبول} \quad \sin x \neq 0$$

$$x = -\pi, \pi, 3\pi$$

$$\text{و باز } \rightarrow [-\pi, \frac{3\pi}{r}] \Rightarrow |\pi - (-\pi)| = (2\pi)$$

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$$\cos^2 x - \sin^2 x \cos^2 x = 1 \quad -V \quad \text{تعداد جواب در فاصله } [0, 2\pi]$$

$$-\sin^2 x \cos^2 x = 1 - \cos^2 x$$

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

$$-\cos^2 x = 1$$

(I)

$$\text{if } \sin x = 0 \rightarrow x = k\pi$$

$$\rightarrow \cos^2 x = -1 \rightarrow x = 2k\pi \pm \pi$$

$$x = \frac{2k\pi}{2} \pm \frac{\pi}{2} \rightarrow x \in \left\{ k\pi, \frac{2k\pi}{2} \pm \frac{\pi}{2} \right\}$$

$$\text{جواب } \leftarrow 0, \pi, 2\pi, \dots \leftarrow [0, 2\pi] \text{ در } \frac{\pi}{2}, \frac{3\pi}{2}$$

~~the answer is~~

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$$\frac{1 - \tan x}{1 + \tan x} = \tan \pi x - 1$$

$$\frac{1 - \frac{\sin x}{\cos x}}{1 + \frac{\sin x}{\cos x}} = \left(\frac{\frac{\cos x - \sin x}{\cos x}}{\frac{\cos x + \sin x}{\cos x}} \right) = \frac{\cos x - \sin x}{\cos x + \sin x}$$

$$\frac{\cos x - \sin x}{\cos x + \sin x} = \frac{\sin \pi x}{\cos \pi x}$$

$$\cos \pi x \cos x - \sin x \cos \pi x = \cos x \sin \pi x + \sin x \sin \pi x$$

$$\cos \pi x \cos x - \sin x \sin \pi x = \sin x \cos \pi x + \cos x \sin \pi x$$

$$\cos x = \sin x \xrightarrow{\div \cos x} \tan x = 1$$

$$x = k\pi + \frac{\pi}{2} \longrightarrow x = \frac{k\pi}{1} + \frac{\pi}{1}$$

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$$\sqrt{1 + \sin^2 x} = \sqrt{2} \cos^2 x \quad \text{جواب } [0, \pi] \quad \rightarrow \cos^2 x > 0 \quad -9$$

$$1 + \sin^2 x = 2 \cos^2 x$$

$$\sin^2 x = 2 \cos^2 x - 1$$

$$\rightarrow \sin^2 x = \cos^2 x \quad \rightarrow \sin^2 x = 1 - \sin^2 x$$

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

$$\sin^2 x = t \rightarrow 2t^2 + t - 1 = 0 \quad \begin{cases} t = -1 \\ t = \frac{1}{2} \end{cases}$$

$$\sin^2 x = -1 \quad \text{حذف شود}$$

$$\rightarrow 2x = 2k\pi + \frac{\pi}{2} \rightarrow x = k\pi + \frac{\pi}{4}$$

دسته های داده شده $\frac{\pi}{4}$ غیر قابل قبول می باشد

$$\cos^2 x > 0$$

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

$$x = k\pi + \frac{\pi}{4} \rightarrow \frac{\pi}{4}$$

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

$$\frac{3\pi}{4} \quad \text{دسته های داده شده} \quad \frac{3\pi}{4} \quad \text{قبل قابل قبول است.}$$

$$\cos \frac{10\pi}{12} < 0 \quad \text{جواب مورد.} \quad \frac{\pi}{12}$$

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

$$[0, 2\pi] \quad -10$$

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

$\underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}}$
 $1 \quad \quad \quad -\cos^2 x$

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

$$x = 2k\pi \pm \pi$$

دائیں بازو کے جواب طرد سے π

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$$b) \sin^3 x - \cos^3 x = -1$$

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

$$= (\sin x - \cos x)(1 + \sin x \cos x)$$

$$x = \pi/2 = 0/2 = \frac{\pi}{2} \text{ (للسان)}$$