

18, 19

نام و نام خانوادگی: پاسخنامه تشریحی تکلیف شماره ۱/۱ کلاس دهانود:
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$$\text{الف) } \cos 2x = 2 \sin x - 1 \rightarrow \cos^2 x - \sin^2 x = 2 \sin x - 1 \rightarrow 1 - 2 \sin^2 x = 2 \sin x - 1$$

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

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

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

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

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

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

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

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

$$\text{د) } 2 \cos^2 x + 2 \sin x \cos x = 1 \rightarrow 2 \cos^2 x + 2 \sin x \cos x = \sin^2 x + \cos^2 x$$

$$\rightarrow \sin^2 x = -\cos^2 x \rightarrow \tan^2 x = -1 \rightarrow 2x = k\pi - \frac{\pi}{2} \rightarrow x = \frac{k\pi}{2} - \frac{\pi}{4}$$

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

$$\rightarrow \cos x = \frac{1}{2} \text{ GÖE} \rightarrow \sin x = \frac{\sqrt{3}}{2}$$

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

$$\text{و) } 2 \sin^2 x - \sin x \cos x + \cos^2 x = 1 \rightarrow 2 \sin^2 x - \sin x \cos x + \cos^2 x = 2 \sin^2 x + 2 \cos^2 x$$

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

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

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

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

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

$$\text{ح) } \cos(2x - \frac{\pi}{4}) = -\sin 2x \rightarrow \cos(2x - \frac{\pi}{4}) = \cos(\frac{\pi}{2} + 2x)$$

$$\rightarrow 2x - \frac{\pi}{4} = 2k\pi + \frac{\pi}{2} + 2x \rightarrow -\frac{\pi}{4} = 2k\pi + \frac{\pi}{2} \rightarrow x = \frac{k\pi}{2} - \frac{3\pi}{8}$$

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

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

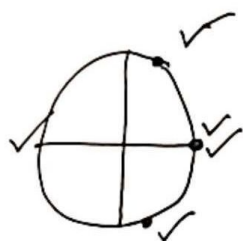
$$\frac{\sin \frac{x}{f}}{1 + \cos \frac{x}{f}} = \frac{1}{\sin \frac{x}{f}} + \cot \frac{x}{f} \rightarrow \frac{\sin \frac{x}{f}}{1 + \cos \frac{x}{f}} = \frac{1 + \cos \frac{x}{f}}{\sin \frac{x}{f}} \rightarrow \tan \frac{x}{f} = \cot \frac{x}{f}$$

$$\rightarrow \tan \frac{x}{f} = 1 \rightarrow \tan \frac{x}{f} = \pm 1 \rightarrow \frac{x}{f} = k\pi \pm \frac{\pi}{4} \rightarrow x = f(k\pi + \frac{\pi}{4}) \rightarrow x = f(k\pi - \frac{\pi}{4}) \rightarrow -\pi$$

$$|-\pi - \pi| = 2\pi$$

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

$$\rightarrow \cos^2 x = 1 \rightarrow x = 2k\pi \text{ or } x = (2k+1)\pi \rightarrow x = \frac{\pi}{2}k\pi + \frac{\pi}{2}$$



جواب

چون $\sin^2 x$ را از طرفین حذف کردیم
باید ریشه آن را بعد در نظر بگیریم.
 $\sin^2 x = 0$

$$x = k\pi$$

$$\frac{1 - \tan x}{1 + \tan x} = \tan^2 x \rightarrow \tan(\frac{\pi}{4} - x) = \tan^2 x \rightarrow x = k\pi + \frac{\pi}{4} - x$$

$$\rightarrow 2x = k\pi + \frac{\pi}{4} \rightarrow x = \frac{k\pi}{2} + \frac{\pi}{8}$$

$$\cos x \neq 0 \rightarrow x \neq 2k\pi \pm \frac{\pi}{2}$$

$$\cos^2 x \neq 0 \rightarrow x \neq (2k+1)\pi \pm \frac{\pi}{2} \rightarrow x \neq \frac{k\pi}{2} \pm \frac{\pi}{4}$$

$$\tan x \neq 1 \rightarrow x \neq k\pi + \frac{\pi}{4}$$

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

$$\sqrt{2} \sin(x + \frac{\pi}{4}) = -1 \rightarrow x = k\pi - \frac{\pi}{4}$$

$$\rightarrow \cos(\frac{\pi}{4} - x) = \cos^2 x \rightarrow \cos(x - \frac{\pi}{4}) = \cos^2 x$$

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

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

$$\begin{cases} k=0 \rightarrow x = \frac{\pi}{12} \\ k=1 \rightarrow x = \frac{5\pi}{12} \\ k=2 \rightarrow x = \frac{9\pi}{12} \end{cases}$$

در این گونه موارد، نقطه $\frac{k\pi}{2}$ را بررسی می‌کنیم:

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

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

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

