


homework questions

Clear desks

Solving trig equations

EX 1: $\cos^{-1}(\cos x) = \cos^{-1}\left(\frac{1}{2}\right)$



$x = \cos^{-1} \frac{1}{2}$
 $(0, 2\pi]$
 $x = \frac{\pi}{3} \quad x = \frac{5\pi}{3}$

$(-\infty, \infty)$
 $x = \frac{\pi}{3} + n2\pi,$
 where $n \in \mathbb{Z}$
 $x = \frac{5\pi}{3} + n2\pi$

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EX 2: $\cos x + \sqrt{2} = -\cos x$

$\begin{matrix} +\cos x & +\cos x \end{matrix}$

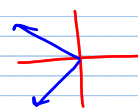
$2\cos x + \sqrt{2} = 0$

$\begin{matrix} -\sqrt{2} & -\sqrt{2} \end{matrix}$

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

$\cos^{-1}(\cos x) = \cos^{-1}\left(\frac{-\sqrt{2}}{2}\right)$

$x = \cos^{-1}\left(\frac{-\sqrt{2}}{2}\right)$



$(0, 2\pi]$
 $x = \frac{3\pi}{4}, \frac{5\pi}{4}$

$x = \frac{3\pi}{4} + n2\pi,$
 where $n \in \mathbb{Z}$
 $x = \frac{5\pi}{4} + n2\pi$

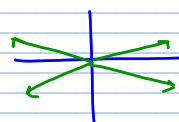
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EX 3: $3\tan^2 x - 1 = 0$

$\begin{matrix} +1 & +1 \end{matrix}$

$\sqrt{\tan^2 x} = \pm \sqrt{\frac{1}{3}}$

$\tan x = \pm \frac{\sqrt{3}}{3}$



$(0, 2\pi]$
 $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

$(-\infty, \infty)$
 $x = \frac{\pi}{6} + n\pi,$
 where $n \in \mathbb{Z}$
 $x = \frac{5\pi}{6} + n\pi$

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Ex 4: $\cot x \cos^2 x = 2 \cot x$

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

$$\cot x (\cos^2 x - 2) = 0$$

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

$(0, 2\pi]$ $\cos^2 x = 2$ *Not a solution*
 $x = \frac{\pi}{2}, \frac{3\pi}{2}$ $\sqrt{\cos^2 x} = \sqrt{2}$ $\cos x \leq 1$
 $(-\infty, \infty)$
 $x = \frac{\pi}{2}, n\pi, \text{ where } n \in \mathbb{Z}$

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30 second expert

Get out paper.

You will become the expert of your question. When we rotate you will switch cards.

you are not allowed to help until time is up.

on the right side of your work write down what you learned from your partner

Extention: See if you can write down the general solution in as few equations as possible.

Ex 5: $2 \sin^2 x + 3 \cos x - 3 = 0$

$$2(1 - \cos^2 x) + 3 \cos x - 3 = 0$$

$$2 - 2 \cos^2 x + 3 \cos x - 3 = 0$$

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

S.N. $-2x^2 + 3x - 1 = 0$ $(2 \cos x - 1)(-\cos x + 1) = 0$

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

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

$(2x-1)(-x+1)$ $(-\infty, \infty)$

$(0, 2\pi]$ $x = \frac{\pi}{3} + 2n\pi, \text{ where } n \in \mathbb{Z}$
 $x = \frac{5\pi}{3}, 2\pi$ $x = \frac{5\pi}{3} + 2n\pi$
 $x = 2\pi + 2n\pi$

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Ex 6: $(\cos x + 1)^2 = (\sin x)^2$

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

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

$$2 \cos^2 x + 2 \cos x = 0$$

$$2 \cos x (\cos x + 1) = 0$$

$$\cos x = 0 \quad \cos x = -1$$

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Ex 7: $2 \cos 3t = 1$

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Ex 8: $3 \tan \frac{x}{2} + 3 = 0$

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Ex 9: $x = 2 \sin x$ $[0, 2\pi)$

use a graphing calculator

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Quick Write: Take two minutes to summarize your learning.

Things you can write about: How do you solve any trigonometric equation? How are general solutions and particular/restricted solutions different. Questions you still have.