

WU

① Multiple Choice What is a solution of the equation $4 \cos x + 2 = 0$?

(A) $\frac{2\pi}{3}$ (B) $\frac{\pi}{6}$ (C) $\frac{5\pi}{3}$ (D) $\frac{\pi}{4}$ (E) $\frac{3\pi}{4}$

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

Multiple Choice What is a solution of the equation $6 \cos x - 6 = 0$?

(A) $\frac{\pi}{4}$ (B) $\frac{2\pi}{3}$ (C) $\frac{3\pi}{4}$ (D) $\frac{\pi}{2}$ (E) $\frac{5\pi}{6}$

$\cos x = 1$

② Multiple Choice What is a solution of the equation $5 \tan x - 5 = 0$?

(A) $-\frac{\pi}{4}$ (B) $\frac{\pi}{6}$ (C) $-\frac{3\pi}{4}$ (D) $\frac{\pi}{12}$ (E) $-\frac{4\pi}{5}$

$\tan x = 1$

Multiple Choice What is a solution of the equation $\sin x = \sqrt{3} \cos x$?

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{6}$ (C) $\frac{2\pi}{3}$ (D) $\frac{\pi}{4}$ (E) $\frac{5\pi}{4}$

Feb 29-8:34 AM

14.4 Solving Trigonometric Functions

General Solutions means...

Interval Solutions means...

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over the interval $0 < x < 2\pi$

EXAMPLE 1 Solve a trigonometric equation

Solve $2 \sin x - \sqrt{3} = 0$.

$\sin x = \frac{\sqrt{3}}{2}$

$180^\circ \frac{2\pi}{3}$

QII $X = 120^\circ$
 $X = \frac{2\pi}{3}$

QI $X = 60^\circ$
 $X = \frac{\pi}{3}$

S/A
T/C

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2.) Provide a general solution:

$2 \cos x + 1 = 0$

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

$X = 60^\circ = \frac{\pi}{3}$

$180^\circ \frac{2\pi}{3}$

S/A
T/C

QII $(120^\circ, \frac{2\pi}{3})$

QIII $(240^\circ, \frac{4\pi}{3})$

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3.) Solve:

$4 \tan^2 x - 4 = 0$ in the interval $0 \leq x < 2\pi$

$\sqrt{\tan^2 x} = \sqrt{1}$

$\tan x = \pm 1$

180°

S/A
T/C

$X = 45^\circ$
 $\frac{\pi}{4}$

QII = $\frac{3\pi}{4}, 135^\circ$

QIII = $\frac{5\pi}{4}, 225^\circ$

QIV = $\frac{7\pi}{4}, 315^\circ$

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Provide a general solution

4.) $6 \cos x + 6 = 0$

$\cos x = -1$

$(@ X = 180^\circ, \pi) \pm 2\pi n$

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Provide a solution over the interval $0 < x < 2\pi$

5.) $3\csc^2 x = 4$

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This is the same concept we're just going to make the solving harder.

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Solve by Factoring out a common term
interval solution

1.) $x^2 - x = 0$
 $x(x-1) = 0$ 1/22

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

$\sin x (\sin x - 1) = 0$ Factor

$\sin x = 0$ or $\sin x - 1 = 0$ Set = 0 solve

$\sin x = 1$ Find c's

@ $x = 0^\circ, 180^\circ$
 $2\pi, \pi$

@ $x = 90^\circ$
 $\frac{\pi}{2}$

Sidebar
 $x^2 - x = 0$

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2.) Solve by Factoring out a common term
general solution

$z^2 - yz = 0$
 $z(z-y) = 0$ 1/22

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

$\tan x (\tan x - \sin x) = 0$ Factor

$\tan x = 0$ Factor $\tan x - \sin x = 0$
 $\tan x = \sin x$

@ $x = 0, 2\pi$ + $-2\pi n$

$\frac{0}{0} = 0$ ditto $\frac{1}{0} = \text{und}$

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3.) Trinomial Factoring to solve
interval solution

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

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

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

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

@ $x = 60^\circ, \frac{\pi}{3}$

@ $x = 300^\circ, \frac{5\pi}{3}$

@ $x = 180^\circ, \pi$

Sidebar
 $2x^2 + x - 1 = 0$
 $(2x-1)(x+1) = 0$
 $2x-1=0$ $x+1=0$
 $x=\frac{1}{2}$ $x=-1$
now find c's

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Solve and provide an interval solutions

4.) $\sin^2 x - \sin x - 2 = 0$

$(\sin x - 2)(\sin x + 1) = 0$ 1/22

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

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

$\sin x = 2$ Not possible

@ $x = 270^\circ$
 $\frac{3\pi}{2}$

Sidebar
 $x^2 - x - 2 = 0$

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1.) $2\cos^2x - 1 = 0$

2.) $\sqrt{3}\sec x + 2 = 0$ $\sec x = -\frac{2}{\sqrt{3}}$

3.) $3\sin x - 10 = -7$

4.) $2\cos^2x - \cos x = 0$

5.) $\sin x + \sin x \cos x = 0$

6.) $\sin^2x - \sin x - 2 = 0$

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

Q I $x = 45^\circ, \frac{\pi}{4}$
 Q II $x = 135^\circ, \frac{3\pi}{4}$
 Q III $x = 225^\circ, \frac{5\pi}{4}$
 Q IV $x = 315^\circ, \frac{7\pi}{4}$

HW #14 $\sin^2x - \sin x - 2 = 0$

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