$\cos^4 x - \sin^4 x = 1 - 2\sin^2 x$

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

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

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

$1 - 2\sin^2 x =$

$$\frac{1}{\sin x \cos x} - \frac{\cos x}{\cos x \sin x} = \tan x$$

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

$$\frac{\sin^2 x}{\cos x \sin x} =$$

$$\tan x$$

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

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

$$\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 = 1$$

$$\frac{1}{4} + \frac{3}{4} = 1$$

$$\frac{4}{4} = 1$$

$$1 = 1$$

$$\frac{\sin x}{\csc x} + \frac{\cos x}{\sec x} = 1$$

$$\sin x \cdot \frac{1}{\csc x} + \cos x \cdot \frac{1}{\sec x} = 1$$

$$\sin x \cdot \sin x + \cos x \cdot \cos x = 1$$

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

$$1 = 1$$

$$\frac{\sec x}{\sec x}\frac{\sin x}{\csc x} + \frac{\cos x}{\sec x \csc x}\cdot\frac{\csc x}{} = 1$$

$$\frac{\sec x \sin x + \cos x \csc x}{\sec x \csc x} = 1$$

$$\frac{\frac{1}{\cos x}\cdot\frac{\sin x}{1} + \cos x \frac{1}{\sin x}}{\sec x \csc x}$$

$$\frac{\tan x + \cot x}{\sec x \csc x} =$$

$$\frac{\frac{1}{\cot x} + \frac{\cot x}{1}\frac{\cot x}{}}{\sec x \csc x}$$

$$\frac{\frac{1+\cot^2 x}{\cot x}}{\sec x \csc x}$$

$$\frac{\frac{\csc^2 x}{\cot x}\cdot\frac{\csc x}{}}{}\cdot\frac{1}{\sec x \csc x}$$

$$\frac{\csc x}{\cot x \sec x}$$

$$\frac{\frac{1}{\sin x}}{\frac{\cos x}{\sin x}\cdot\frac{1}{\cos x}}$$

$$\frac{\frac{1}{\sin x}}{\frac{1}{\sin x}} = 1$$

$$\frac{1}{1+\cos x} = \csc^2 x - \csc x \cot x$$

$$\csc x\left(\csc x - \cot x\right)$$

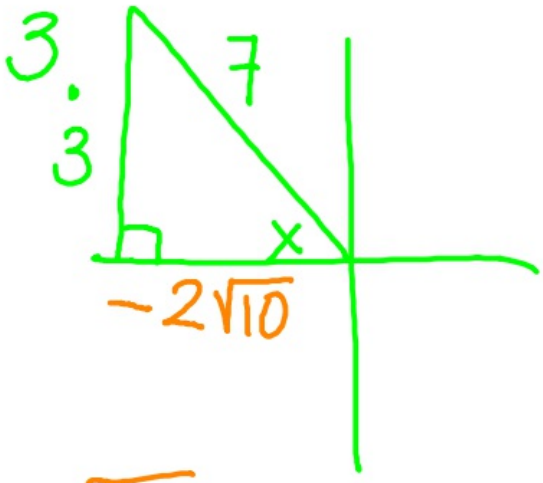
$$\frac{1}{\sin x}\left(\frac{1}{\sin x} - \frac{\cos x}{\sin x}\right)$$

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

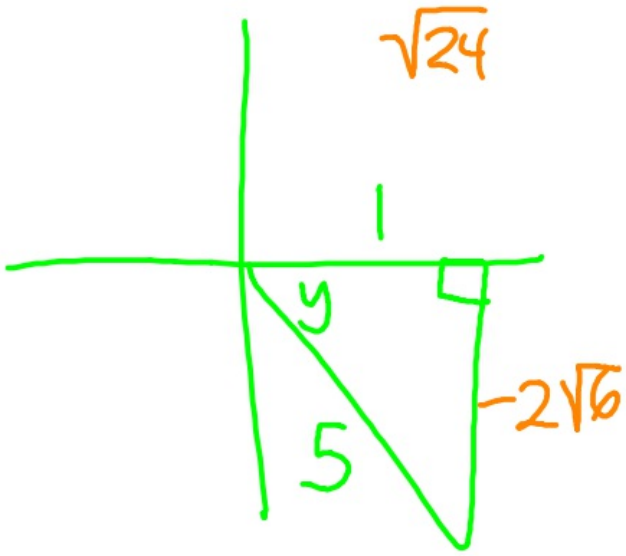
$$\frac{1-\cos x}{1-\cos^2 x}$$

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

going over worksheet on triangles



$\sqrt{40}$



$\sin(x-y) = \sin x\cos y - \sin y\cos x$

$\left(\frac{3}{7}\right)\left(\frac{1}{5}\right) - \left(\frac{-2\sqrt{6}}{5}\right)\left(\frac{-2\sqrt{10}}{7}\right)$

$\frac{3}{35} - \frac{4\sqrt{60}}{35}$

$\frac{3}{35} - \frac{8\sqrt{15}}{35}$

$$\sin(2y) = 2\sin y \cos y$$

$$= \frac{2}{1}\left(\frac{-2\sqrt{6}}{5}\right)\left(\frac{1}{5}\right)$$

$$= \frac{-4\sqrt{6}}{25}$$

$$\sin(x-y) = \frac{3-8\sqrt{15}}{35}$$

$$\cos(x-y) = \frac{-2\sqrt{10}-6\sqrt{6}}{35}$$

$$\frac{\frac{3-8\sqrt{15}}{35}}{\frac{-2\sqrt{10}-6\sqrt{6}}{35}}$$

$$\frac{3-8\sqrt{15}}{-2\sqrt{10}-6\sqrt{6}}$$

Solving Trig Equations (Single $\angle$)

- isolate the trig word
- if more than 1 trig word, either
  1. subs to get 1 word
  2. factor to separate
- use U.C. info to solve.
- fit ans. to the directions
  1. all solns $\rightarrow$ $+\pi n$ or $+2\pi n$
  2. $[0, 2\pi)$ or $0 \leq \theta < 2\pi$

NO $+\pi n / +2\pi n$

Ex Solve. $[0, 2\pi)$

A. $2\sin x - 1 = 0$

$+1 \quad +1$

$\sin x = \frac{1}{2}$ $\quad \frac{2\sin x}{2} = \frac{1}{2}$

$x = \frac{\pi}{6}$

$x = \frac{5\pi}{6}$

B. $3\tan^2 x - 1 = 0$

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

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

$\frac{1}{2}$

$\frac{\sqrt{3}}{2}$

$x = \frac{\pi}{6}$ $\quad x = \frac{7\pi}{6}$

$x = \frac{5\pi}{6}$ $\quad x = \frac{11\pi}{6}$

C. $\cot x \cos^2 x = 2\cot x$

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

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

$\cot x = 0$

$x = \frac{\pi}{2}$

$x = \frac{3\pi}{2}$

$2 - \cos^2 x = 0$

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

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

dne

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

D. $2\sin^2 x + 3\cos x - 3 = 0$

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

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

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

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

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

$2\cos x - 1 = 0$

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

$x = \frac{\pi}{3}$

$x = \frac{5\pi}{3}$

$\cos x - 1 = 0$

$\cos x = 1$

$x = 0\pi$

$0\pi, \frac{\pi}{3}, \frac{5\pi}{3}$

E. $\sec^2 x - 2\tan x = 4$

$(1+\tan^2 x) - 2\tan x = 4$

$\tan^2 x - 2\tan x - 3 = 0$

$x^2 - 2x - 3$

$(x-3)(x+1)$

$-3, -2$

$(\tan x - 3)(\tan x + 1) = 0$

$\tan x - 3 = 0$

$\tan x = 3$

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

$\tan x + 1 = 0$

$\tan x = -1$

$x = \frac{3\pi}{4}, \frac{7\pi}{4}$

$\frac{3\pi}{4}, \frac{7\pi}{4}, \arctan 3$

Ex Solve.

Find all solutions.

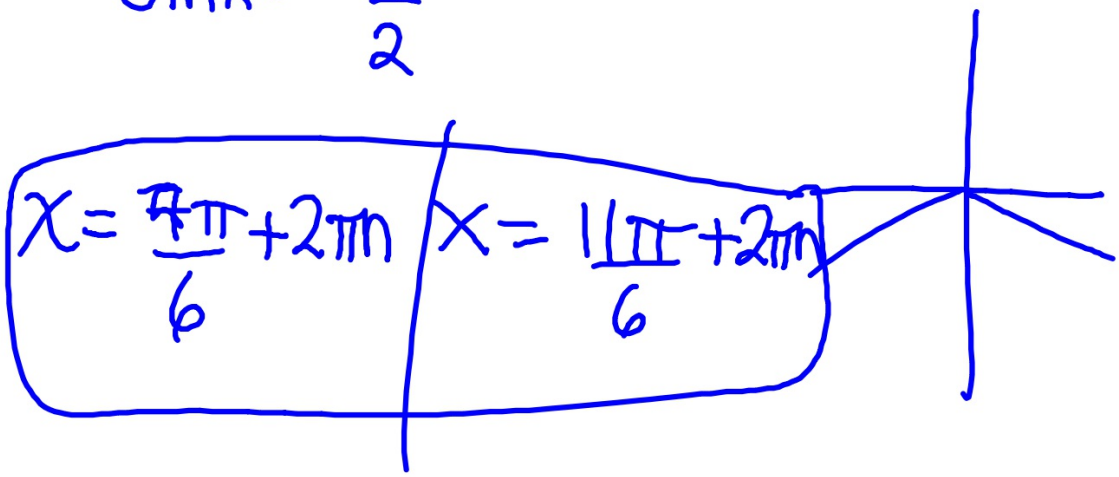
All real solutions.

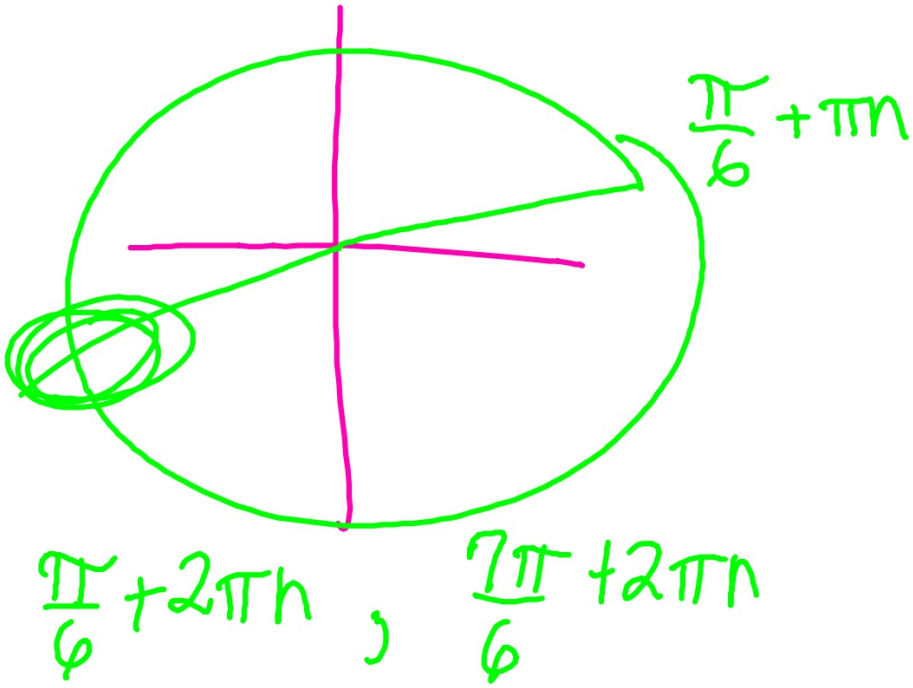
$+2\pi n$

Get all U.C. values & all their coterminal buds.

A. $2\sin x + 1 = 0$

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





Only use pi n if angles form a line

B. $2\sin^2 x - \sin x - 1 = 0$

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

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

$\sin x - 1 = 0$

$\sin x = 1$

$x = \frac{\pi}{2} + 2\pi n$

$2\sin x + 1 = 0$

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

$x = \frac{7\pi}{6} + 2\pi n, \frac{11\pi}{6} + 2\pi n$

$\frac{\pi}{2} + 2\pi n$

$\frac{7\pi}{6} + 2\pi n$

$\frac{11\pi}{6} + 2\pi n$