14-4 Using Identities in Trig Equations

$\tan A = \frac{\sin A}{\cos A}$

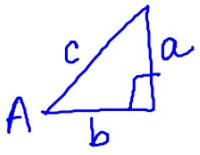
$\cot A = \frac{\cos A}{\sin A}$

Pythagorean Identities

1. $\sin^2 A + \cos^2 A = 1$

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

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



$\frac{a^2}{c^2} + \frac{b^2}{c^2} = \frac{a^2+b^2}{c^2} = \frac{c^2}{c^2} = 1$

2. $1 + \cot^2 A = \csc^2 A$

$1 = \csc^2 A - \cot^2 A$

$\cot^2 A = \csc^2 A - 1$

3. $\tan^2 A + 1 = \sec^2 A$

$\tan^2 A = \sec^2 A - 1$

$1 = \sec^2 A - \tan^2 A$

1 Solve over $0 \le x < 2\pi$

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

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

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

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

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

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

$-90^\circ = 270^\circ$

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

Q1, Q2

$30^\circ, 150^\circ$

$\pi/6, 5\pi/6$

2 Solve over $0° \le x < 360°$

$$\csc^2 x - \cot^2 x = \tan^2 x - 8$$

$(\sec^2 x - (\csc^2 x - 1)$

$1 = \tan^2 x - 8$

$9 = \tan^2 x$

$\pm 3 = \tan x$

Q1, Q2, Q3, Q4

$71.6°, 108.4°, 251.6°, 288.4°$

3 Solve over. $0 \le x < 2\pi$

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

rotations

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

	1st rot.	2nd rot.
	Q2 Q3	Q2 Q3
$2x = y =$	$120^\circ, 240^\circ$	480° 600°
$x =$	$60^\circ, 120^\circ$	$240^\circ, 300^\circ$
	$\pi/3, 2\pi/3$	$4\pi/3$ $5\pi/3$