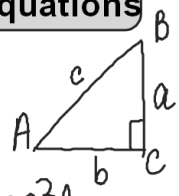
Using Identities in Trig Equations

May 27

Pythagorean Identities



$\left(\frac{a}{c}\right)^2 + \left(\frac{b}{c}\right)^2 = \frac{a^2+b^2}{c^2} = \frac{c^2}{c^2} = 1$

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

$\div \sin^2 A$

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

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

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

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

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

$\div \cos^2 A$

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 $0 \le x < 2\pi$

$2y^2 - z = 1 = 0$

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

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

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

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

$2y^2 + y - 1$

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

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

$x = 270^\circ$

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

Q1, Q2

$x = 30^\circ, 150^\circ$

$\frac{\pi}{6}, \frac{5\pi}{6}$

2 Solve over $0° \le x < 360°$

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

$$1 = \tan^2 x - 8$$

$$\pm\sqrt{9} = \sqrt{\tan^2 x}$$

$$\pm 3 = \tan x$$

Q1 (+) Q2 (−) Q3 (+) Q4 (−)

$x = 71.6°,\ 108.4°,\ 251.6°,\ 288.4°$