

Math 1613 - Trigonometry

Quiz #2 - 2010.09.09

Solutions

1. Write each of the following functions in terms of their cofunctions.

a) $\cot(73^\circ)$

$$\begin{aligned}\cot(73^\circ) &= \tan(90^\circ - 73^\circ) \\ &= \tan(17^\circ)\end{aligned}$$

b) $\cos(\theta + 13^\circ)$

$$\begin{aligned}\cos(\theta + 13^\circ) &= \sin(90^\circ - (\theta + 13^\circ)) \\ &= \sin(77^\circ - \theta)\end{aligned}$$

c) $\sec(\theta - 43^\circ)$

$$\begin{aligned}\sec(\theta - 43^\circ) &= \csc(90^\circ - (\theta - 43^\circ)) \\ &= \csc(47^\circ - \theta)\end{aligned}$$

2. Find one solution, θ for the following equation

$$\cos(2\theta + 50^\circ) = \sin(2\theta - 20^\circ)$$

We will do this problem both ways. First, using cos only:

$$\begin{aligned}\cos(2\theta + 50^\circ) &= \sin(2\theta - 20^\circ) \\ \cos(2\theta + 50^\circ) &= \cos(90^\circ - (2\theta - 20^\circ)) \\ \cos(2\theta + 50^\circ) &= \cos(110^\circ - 2\theta)\end{aligned}$$

Therefore,

$$2\theta + 50^\circ = 110^\circ - 2\theta$$

Solving for θ gives $\theta = 15^\circ$.

Secondly, using sin only:

$$\begin{aligned}\cos(2\theta + 50^\circ) &= \sin(2\theta - 20^\circ) \\ \sin(90^\circ - (2\theta + 50^\circ)) &= \sin(2\theta - 20^\circ) \\ \sin(40^\circ - 2\theta) &= \sin(2\theta - 20^\circ)\end{aligned}$$

Therefore,

$$40^\circ - 2\theta = 2\theta - 20^\circ$$

Solving for θ gives $\theta = 15^\circ$.