

Unit 6: Trig Identities and Equations

Lesson 3: Sum and Difference Formulas

Answers p. 408 #43 - 49

$$\begin{aligned} 43. \cos(\pi - \theta) + \sin\left(\frac{\pi}{2} + \theta\right) &= \cos \pi \cos \theta + \sin \pi \sin \theta + \sin \frac{\pi}{2} \cos \theta + \sin \theta \cos \frac{\pi}{2} \\ &= (-1)(\cos \theta) + (0)(\sin \theta) + (1)(\cos \theta) + (\sin \theta)(0) = -\cos \theta + \cos \theta = 0 \end{aligned}$$

$$\begin{aligned} 45. \tan(x + \pi) - \tan(\pi - x) &= \frac{\tan x + \tan \pi}{1 - \tan x \cdot \tan \pi} - \frac{\tan \pi - \tan x}{1 + \tan \pi \tan x} \\ &= \frac{\tan x}{1} - \left(-\frac{\tan x}{1}\right) \\ &= 2 \tan x \end{aligned}$$

$$47. \sin(x + y) + \sin(x - y) = \sin x \cos y + \sin y \cos x + \sin x \cos y - \sin y \cos x = 2 \sin x \cos y$$

$$\begin{aligned} 49. \cos(x + y)\cos(x - y) &= [\cos x \cos y - \sin x \sin y][\cos x \cos y + \sin x \sin y] \\ &= \cos^2 x \cos^2 y - \sin^2 x \sin^2 y \\ &= \cos^2 x(1 - \sin^2 y) - \sin^2 x \sin^2 y \\ &= \cos^2 x - \sin^2 y(\cos^2 x + \sin^2 x) \\ &= \cos^2 x - \sin^2 y \end{aligned}$$