

Questions from homework

D.O.S. ↓

(18)  $\frac{\sin^4 \theta - \cos^4 \theta}{\sin^2 \theta \cos^2 \theta - \cos^4 \theta} = \frac{\boxed{\csc^2 \theta}}{\boxed{\cot^2 \theta}}$

C.F. →  $\frac{(\boxed{\sin^2 \theta + \cos^2 \theta})(\cancel{\sin^2 \theta - \cos^2 \theta})}{\cos^2 \theta (\cancel{\sin^2 \theta - \cos^2 \theta})}$

$\frac{1}{\cos^2 \theta}$

$\frac{1/\sin^2 \theta}{\frac{\cos^2 \theta}{\sin^2 \theta}}$

$\frac{1}{\cancel{\sin^2 \theta}} \cdot \frac{\cancel{\sin^2 \theta}}{\cos^2 \theta}$

$\frac{1}{\cos^2 \theta}$

(1)  $\frac{\boxed{\tan^2 \theta}}{\boxed{\tan^2 \theta + 1}} = \boxed{\sin^2 \theta}$

$\frac{\frac{\sin^2 \theta}{\cos^2 \theta}}{\sec^2 \theta}$

$\frac{\frac{\sin^2 \theta}{\cos^2 \theta}}{\frac{1}{\cos^2 \theta}}$

$\frac{\cancel{\sin^2 \theta}}{\cancel{\cos^2 \theta}} \cdot \cos^2 \theta$

$\boxed{\sin^2 \theta}$

## Sum & Difference Identities

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

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

$$\sin(\overset{x}{30^\circ} + \overset{y}{60^\circ}) = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$$

$$\sin(90^\circ) = \left(\frac{1}{2}\right)\left(\frac{1}{2}\right) + \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2}\right)$$

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

$$1 = 1$$

## Sum & Difference Identities

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

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

Prove the following:

$$\cos(\alpha + \beta) - \cos(\alpha - \beta) = -2 \sin \alpha \sin \beta$$

$$\boxed{\cos(x+y)} - \boxed{\cos(x-y)} = -2 \sin x \sin y$$

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

$$\cancel{\cos x \cos y} - \sin x \sin y - \cancel{\cos x \cos y} - \sin x \sin y$$

$$\boxed{-2 \sin x \sin y}$$

## Double Angle Identities

$$\sin 2\theta = 2\sin \theta \cos \theta$$

$$\cos 2\theta = \cos^2 \theta - \sin^2 \theta$$

Prove the following:

$$\frac{1 + \cos 2\theta}{\sin 2\theta} = \cot \theta$$

$$\frac{1 + (\cos^2 \theta - \sin^2 \theta)}{2 \sin \theta \cos \theta}$$

Pythagorean

$$\frac{1 - \sin^2 \theta + \cos^2 \theta}{2 \sin \theta \cos \theta}$$

$$\frac{\cos^2 \theta + \cos^2 \theta}{2 \sin \theta \cos \theta}$$

$$\frac{\cancel{2} \cos^2 \theta}{\cancel{2} \sin \theta \cancel{\cos \theta}}$$

$$\frac{\cos \theta}{\sin \theta}$$

$$\frac{\cos \theta}{\sin \theta}$$

# Homework