Advanced Math 7.2 Extra Practice

Name Key

Prove the given identity.

N. $\cot^2\theta+\cos^2\theta+\sin^2\theta=\csc^2\theta$

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

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

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

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

$\frac{1}{\sin^2\theta}=\csc^2\theta$

$\csc^2\theta=\csc^2\theta$

O. $\frac{\sin\theta}{\csc\theta}+\frac{\cos\theta}{\sec\theta}=\sin\theta\csc\theta$

$\frac{\sin\theta}{\frac{1}{\sin\theta}}+\frac{\cos\theta}{\frac{1}{\cos\theta}}=\sin\theta\csc\theta$

$\sin^2\theta+\cos^2\theta=\sin\theta\csc\theta$

$1=\sin\theta\cdot\frac{1}{\sin\theta}$

$1=\frac{\sin\theta}{\sin\theta}$

$1=1$

P. $\tan^2 x-\sin^2 x=\tan^2 x\sin^2 x$

$\frac{\sin^2x}{\cos^2x}-\sin^2x=\frac{\sin^2x}{\cos^2x}\cdot\sin^2x$

$\frac{\sin^2x}{\cos^2x}-\frac{\sin^2x\cos^2x}{\cos^2x}=\frac{\sin^2x}{\cos^2x}\cdot\sin^2x$

$\frac{\sin^2x-\sin^2x\cos^2x}{\cos^2x}=\frac{\sin^4x}{\cos^2x}$

$\frac{\sin^2x(1-\cos^2x)}{\cos^2x}=\frac{\sin^4x}{\cos^2x}$

$\frac{\sin^2x\cdot\sin^2x}{\cos^2x}=\frac{\sin^4x}{\cos^2x}$

$\frac{\sin^4x}{\cos^2x}=\frac{\sin^4x}{\cos^2x}$

Q. $\frac{\sin\theta}{\sin\theta+\cos\theta}=\frac{\tan\theta}{1+\tan\theta}$

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

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

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

$\frac{\sin\theta}{\sin\theta+\cos\theta}=\frac{\sin\theta}{\cos\theta}\cdot\frac{\cos\theta}{\cos\theta+\sin\theta}$

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

R. $\dfrac{\cot\theta-\tan\theta}{\sin\theta\cos\theta}=\csc^2\theta-\sec^2\theta$

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

$$\frac{\frac{\cos^2\theta}{\sin\theta\cos\theta}-\frac{\sin^2\theta}{\sin\theta\cos\theta}}{\sin\theta\cos\theta}=\frac{\cos^2\theta}{\sin^2\theta\cos^2\theta}-\frac{\sin^2\theta}{\sin^2\theta\cos^2\theta}$$

$$\frac{\cos^2\theta-\sin^2\theta}{\sin^2\theta\cos^2\theta}=\frac{\cos^2\theta-\sin^2\theta}{\sin^2\theta\cos^2\theta}$$

S. $\dfrac{1-\sin^2\theta}{1+\cot^2\theta}=\sin^2\theta\cos^2\theta$

$$\frac{\cos^2\theta}{\csc^2\theta}=\sin^2\theta\cos^2\theta$$

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

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

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

T. $\dfrac{\tan^2\theta}{1+\tan^2\theta}=\sin^2\theta$

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

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

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

$$\sin^2\theta=\sin^2\theta$$

U. $\dfrac{\tan x}{1+\sec x}+\dfrac{1+\sec x}{\tan x}=2\csc x$

$$\frac{\frac{\sin x}{\cos x}}{1+\frac{1}{\cos x}}+\frac{1+\frac{1}{\cos x}}{\frac{\sin x}{\cos x}}=2\csc x$$

$$\frac{\frac{\sin x}{\cos x}}{\frac{\cos x}{\cos x}+\frac{1}{\cos x}}+\frac{\frac{\cos x}{\cos x}+\frac{1}{\cos x}}{\frac{\sin x}{\cos x}}=2\csc x$$

$$\frac{\frac{\sin x}{\cos x}}{\frac{\cos x+1}{\cos x}}+\frac{\frac{\cos x+1}{\cos x}}{\frac{\sin x}{\cos x}}=2\csc x$$

$$\frac{\sin x\cos x}{\cos x(\cos x+1)}+\frac{(\cos x+1)\cos x}{\cos x\sin x}=2\csc x$$

$$\frac{\sin x}{\cos x+1}+\frac{\cos x+1}{\sin x}=2\csc x$$

$$\frac{\sin^2 x}{\sin x(\cos x+1)}+\frac{\cos^2 x+2\cos x+1}{\sin x(\cos x+1)}=2\csc x$$

$$\frac{\sin^2 x+\cos^2 x+2\cos x+1}{\sin x(\cos x+1)}=2\csc x$$

$$\frac{2\cos x+2}{\sin x(\cos x+1)}=2\csc x$$

$$\frac{2(\cos x+1)}{\sin x(\cos x+1)}=2\csc x$$

$$\frac{2}{\sin x}=\frac{2}{\sin x}$$

1. $-\tan x \cos x = sin(-x)$

$-\frac{\sin x}{\cos x} \cdot \cos x = -\sin x$

$-\sin x = -\sin x$

2. $cot^2x(1 + tan^2x) = csc^2x$

$\frac{\cos^2 x}{\sin^2 x}(\sec^2 x) = \frac{1}{\sin^2 x}$

$\frac{\sin^2 x}{\cos^2 x} \cdot \frac{\cos^2 x}{\sin^2 x}\left(\frac{1}{\cos^2 x}\right) = \frac{1}{\sin^2 x} \cdot \frac{\sin^2 x}{\cos^2 x}$

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

3. $\frac{\sec x}{\csc x} = \tan x$

$\frac{\frac{1}{\cos x}}{\frac{1}{\sin x}} = \frac{\sin x}{\cos x}$

$\frac{1}{\cos x} \cdot \frac{\sin x}{1} = \frac{\sin x}{\cos x}$

$\frac{\sin x}{\cos x} = \frac{\sin x}{\cos x}$

4. $\cot x \sin x = \cos x$

$\frac{\cos x}{\sin x} \cdot \sin x = \cos x$

$\cos x = \cos x$

5. $\cos x \csc x = \cot x$

$\cos x \cdot \frac{1}{\sin x} = \frac{\cos x}{\sin x}$

$\frac{\cos x}{\sin x} = \frac{\cos x}{\sin x}$

6. $\frac{\cos x + \sin x}{\sin x} = 1 + \cot x$

$\frac{\cos x + \sin x}{\sin x} = 1 + \frac{\cos x}{\sin x}$

$\frac{\cos x + \sin x}{\sin x} = \frac{\sin x}{\sin x} + \frac{\cos x}{\sin x}$

$\frac{\cos x + \sin x}{\sin x} = \frac{\sin x + \cos x}{\sin x}$

$\frac{\cos x + \sin x}{\sin x} = \frac{\cos x + \sin x}{\sin x}$