

Precalculus A

5.1 Fundamental Identities

Day 2

Hw: Finish 5.1 WS #2

D. Paulson

Homework Questions???

$$\begin{aligned} \frac{\tan x + \cot x}{\cot x} &= \frac{\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}}{\frac{\cos x}{\sin x}} \\ &= \frac{\frac{\sin^2 x + \cos^2 x}{\cos x \sin x}}{\frac{\cos x}{\sin x}} \\ &= \frac{\frac{1}{\cos x \sin x}}{\frac{\cos x}{\sin x}} = \frac{1}{\cos x \sin x} \cdot \frac{\sin x}{\cos x} \\ &= \frac{1}{\cos^2 x} = \sec^2 x \end{aligned}$$

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Relationships with Negatives

$$\sin(-\theta) = -\sin\theta$$

$$\csc(-\theta) = -\csc\theta$$

$$\cos(-\theta) = \cos\theta$$

$$\sec(-\theta) = \sec\theta$$

$$\tan(-\theta) = -\tan\theta$$

$$\cot(-\theta) = -\cot\theta$$

sin x

+	+
-	-

cos x

-	+
-	+

tan x

-	+
+	-

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Use basic identities to simplify the expression.

$$\frac{\cos(-x) \sec x}{\sin x}$$

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

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

$$= \csc x$$

$$\sin(-x) \csc x$$

$$\frac{-\sin x}{1} \cdot \frac{1}{\sin x}$$

$$= -1$$

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Co-Function Identities

$$\sin(90^\circ - \theta) = \cos\theta$$

$$\cos(90^\circ - \theta) = \sin\theta$$

$$\tan(90^\circ - \theta) = \cot\theta$$

$$\cot(90^\circ - \theta) = \tan\theta$$

$$\sec(90^\circ - \theta) = \csc\theta$$

$$\csc(90^\circ - \theta) = \sec\theta$$

$$\cos \frac{1}{2} = 60^\circ$$

$$\sin 30^\circ = \frac{1}{2}$$

$$\tan(90 - 45)^\circ = \cot 45^\circ$$

$$1 = 1$$

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Use basic identities to simplify the expression.

$$\frac{\cos(90^\circ - x)}{\cos x}$$

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

$$\sin^3 x + \sin x \cos^2 x$$

$$\sin x (\sin^2 x + \cos^2 x)$$

$$\sin x (1) = \sin x$$

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Simplify the expression to either a constant or a basic trigonometric function.

$$1. \frac{\tan(90-x)\csc(x)}{\csc^2(x)}$$

$$\frac{\cot x \csc x}{\csc^2 x}$$

$$\frac{\cos x \cdot \csc x}{\sin x \cdot \csc^2 x}$$

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

$$2. \frac{1+\tan(x)}{1+\cot(x)}$$

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

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

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

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