## 7.1: (Trigonometric Identities)

$\frac{\cos x - \cot x}{1 - \sin x}$ is identical to

A) $\tan x$

B) $\cot x$

C) $-\tan x$

D) 0

E) $-\cot x$

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

A) $2\sec\theta$

B) $2\csc\theta$

C) $2\cos\theta$

D) $2\sin\theta$

E) $2\cot\theta$

Which one of the following statements is TRUE?

A) $\tan^2 x = \sin^2 x \tan^2 x + \sin^2 x$

B) $\tan^2 x = 1 + \sec^2 x$

C) $\tan^2 x = (\sec x + 1)^2$

D) $\tan^2 x = 1 - \cot^2 x$

E) $\tan^2 x = \frac{\sin^2 x}{\sin^2 x - 1}$

If $A = \ln(\sec^2 x) - \ln(\tan^2 x)$, then $e^A - 1 =$

A) $\cot^2 x$

B) $\sec^2 x$

C) $\cos^2 x$

D) 0

E) 1

The expression $\frac{\cos x}{1-\sin x} - \tan x$ simplifies to

A) $\sec x$

B) $-\sec x$

C) $\csc x$

D) $-\csc x$

E) $2\tan x$

$\ln\left(e^{\sin^2 x} e^{\cos^2 x}\right) =$

A) 1

B) 0

C) $e^{\sec x}$

D) $e^{\csc x}$

E) $2\cos x + 2\sin x$

If $A = 3\sin^2\alpha + 3\cos^2\alpha$ and $B = 4\cot^2\alpha - 4\csc^2\alpha$, then $A + B =$

A) -1

B) 0

C) 7

D) 1

E) -7

Th expression $\frac{\tan^2 x}{1+\sec x}$ is identical to

A) $\frac{1-\cos x}{\cos x}$

B) $\frac{1-\cos x}{\sin x}$

C) $\frac{1-\sin x}{\sin x}$

D) $\frac{1+\cos x}{\cos x}$

E) $\frac{1+\sin x}{\sin x}$

If $\frac{(\tan x+\cot x)^2}{\sin^2 x-\sin^4 x} = \sec^m x \csc^n x$, then $m+n=$

A) 8

B) 6

C) 4

D) 10

E) 12

$\frac{\cot\theta-\tan\theta}{\sin\theta\cos\theta}$ is identical to:

A) $\csc^2\theta-\sec^2\theta$

B) $\sec^2\theta-\csc^2\theta$

C) $1-\sec^2\theta$

D) $\sec\theta+\csc\theta$

E) $1-\csc^2\theta$

If $\pi < \theta < \frac{3\pi}{2}$, then $\cos\theta =$

A) $-\frac{\cot\theta\sqrt{1+\cot^2\theta}}{1+\cot^2\theta}$

B) $\frac{\cot\theta\sqrt{1+\cot^2\theta}}{1+\cot^2\theta}$

C) $-\sqrt{1+\cot^2\theta}$

D) $\frac{\sqrt{1+\cot^2\theta}}{1+\cot^2\theta}$

E) $-\frac{\sqrt{1+\cot^2\theta}}{1+\cot^2\theta}$

$$\frac{1+\cot^2\theta}{1-\csc^2\theta} =$$

A) $-\sec^2\theta$

B) $\sec^2\theta - 2$

C) $-\csc^2\theta$

D) $\csc^2\theta - 2$

E) $-\csc^2\theta - \sec^2\theta$

The expression $\frac{1}{1+\csc x} - \frac{1}{1+\csc(-x)}$ simplifies to

A) $2\sin x \sec^2 x$

B) 0

C) $-2\sin x \sec^2 x$

D) $-2\tan^2 x$

E) 2

If $\frac{\sec x+\csc x}{\tan x+\cot x} = a\sin x + b\cos x$, then $a + b =$

A) 2

B) 1

C) 3

D) 4

E) 0

$$\tan\theta + \frac{1}{\sec\theta + \tan\theta} =$$

A) $\sec\theta$

B) $\cos\theta$

C) $1 + \sin\theta$

D) 1

E) $\sin\theta$

$$(\sin^2 x)(1 + \cot x) + (\cos^2 x)(1 - \tan x) + \cot^2 x =$$

A) $\csc^2 x$

B) $\sec^2 x$

C) $\tan^2 x$

D) $\cot^2 x$

E) $\cos^2 x$

$\tan^2(-x) - \sin^2(-x) - \cos^2(x) =$

A) $-1 + \tan^2 x$

B) $\sec^2 x$

C) $1 + \cot^2 x$

D) $\csc^2 x$

E) $\sin^2 x - \cos^2 x$

$(\cot x - \csc x)^2 =$

A) $\frac{1-\cos x}{1+\cos x}$

B) $\frac{1+\cos x}{1-\cos x}$

C) $\frac{\cos x-\sin x}{1+\cos x}$

D) $\frac{\sin x}{1-\cos x}$

E) $\frac{\cos x}{1+\cos x}$

$\frac{\tan x - \cot x}{\tan x + \cot x}$ is identical to

A) $1 - 2\cos^2 x$

B) $1 - \tan^2 x$

C) $1 + \sec^2 x$

D) $1 + 2\sin^2 x$

E) $1 + 2\cos^2 x$

Which one of the following statements is TRUE?

A) $\sin x = \sqrt{1 - \cos^2 x}$, if $0 \leq x \leq \pi$.

B) $\csc x = \sqrt{1 + \cot^2 x}$

C) $\sqrt{\cos^2 x} = \cos x$ is an identity.

D) $\sin^3 x = \sin x(1 + \cos^2 x)$

E) $\cos^4 x + 1 = (\cos^2 x - 1)(\cos^2 x + 1)$

$\sin^3\theta + \cos^3\theta + \sin\theta\cos^2\theta + \sin^2\theta\cos\theta =$

A) $\sin\theta + \cos\theta$

B) $\sin\theta - \cos\theta$

C) $\cos\theta - \sin\theta$

D) $2(\sin\theta + \cos\theta)$

E) $2\sin\theta\cos\theta$

$\sec^2 x - 2\sec x\tan x + \tan^2 x =$

A) $\frac{1-\sin x}{1+\sin x}$

B) $\frac{1+\sin x}{1-\sin x}$

C) $\frac{1+\tan x}{1-\tan x}$

D) $\frac{1-\cos x}{1+\cos x}$

E) $\frac{1+\cos x}{1-\cos x}$

If $\csc\theta = \frac{x+1}{x}, x > 0$, then $\cot\theta =$

A) $\frac{\sqrt{1+2x}}{x}$

B) $\frac{\sqrt{2x-1}}{x}$

C) $\frac{\sqrt{x^2+2x}}{x}$

D) $\frac{\sqrt{2x^2+2x+1}}{x}$

E) $\frac{1}{x}$

If $(\tan x \sin x)^2 = A\tan^2 x + B\sin^2 x$ is an identity, then $A + B =$

A) 0

B) -2

C) 2

D) 1

E) -1

$2\csc^2 x - 2\csc x \cot x - 1 =$

A) $\frac{1-\cos x}{1+\cos x}$

B) $\frac{1+\cos x}{1-\cos x}$

C) $\frac{1-\sin x}{1+\cos x}$

D) $\frac{1+\sin x}{1-\cos x}$

E) $\frac{\cos x-1}{\sin x+1}$

$(\sin\theta + \csc\theta)^2 + (\cos\theta + \sec\theta)^2 - \tan^2\theta - \cot^2\theta =$

A) 7

B) 3

C) 5

D) 0

E) 1

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

A) $\sin x\cos x$

B) $\cos^2 x$

C) $-\cot x\sin^2 x$

D) $\cot x\sin^2 x$

E) $-\sec x\csc^2 x$

$$\tan^2 \frac{25\pi}{3} - \sec^2 60° + 1 =$$

A) 0

B) $\frac{3}{2}$

C) $\frac{7}{4}$

D) $\frac{3}{4}$

E) 2

$(\csc^2 x)(1+\cos x)^2 =$

A) $\frac{\sec x \csc x+1}{\sec x \csc x-1}$

B) $\frac{\sec x+\csc x}{\sec x-\csc x}$

C) $\frac{\sec x+1}{\sec x-1}$

D) $\frac{1}{\sec x-1}$

E) $\frac{\sec x+1}{\sec x}$

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

A) $\cos\theta - \sin\theta$

B) $\frac{1+\cos\theta}{\sin\theta}$

C) $\frac{1+\sin\theta}{\sin\theta}$

D) $\frac{1-\sin\theta}{\sin\theta}$

E) $\frac{1-\cos\theta}{\cos\theta}$

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

A) $-\tan x$

B) $\tan x$

C) $\sec x$

D) $-\sec x$

E) $\sin x$

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

A) $-2\cot x\csc x$

B) $2\tan x\csc x$

C) $2\tan x\sec x$

D) $-2\cot x\sec x$

E) -2

$\frac{\cot x+\csc x}{\sin x+\tan x}$ simplifies to:

A) $\csc x\cot x$

B) $\sin x\tan x$

C) $\sin x\cos x$

D) $\sec^2 x\tan x$

E) $\sin x\sec^2 x$

$$\frac{2\sec\theta\csc\theta - 2\tan\theta\csc\theta}{(\sec\theta - \tan\theta)^2 + 1} =$$

A) $\cot\theta$

B) $\tan\theta$

C) $2\sec\theta$

D) $2\csc\theta$

E) $2\sec\theta\tan\theta$

$\tan^2 x(1 + \cot^2 x) =$

A) $\frac{1}{1-\sin^2 x}$

B) $\frac{1}{1-\cos^2 x}$

C) $\csc^2 x$

D) $-\sec^2 x$

E) $-\csc^2 x$

When simplified, the expression $(2\sin x + \cos x)^2 + (2\cos x - \sin x)^2 - 5$ is equal

A) 0

B) -5

C) 1

D) $8\sin x\cos x$

E) $3\sin^2 x + 5\cos^2 x - 5$

The expression $\frac{\sin\theta}{1-\cot\theta} + \frac{\cos\theta}{1-\tan\theta}$ simplifies to:

A) $\sin\theta + \cos\theta$

B) $\sin\theta - \cos\theta$

C) $\frac{1}{\sin\theta - \cos\theta}$

D) $\cos\theta - \sin\theta$

E) $\frac{1}{\cos\theta - \sin\theta}$

$\frac{\cos x - \cot x}{1-\sin x}$ is identical to

A) $\tan x$

B) $\cot x$

C) $-\tan x$

D) 0

E) $-\cot x$

The expression $(\sin\theta - \cos\theta)(\csc\theta + \sec\theta)$ simplifies to

A) $\tan\theta - \cot\theta$

B) $\sec\theta - \tan\theta$

C) $\csc\theta\cot\theta$

D) 1

E) 0

$\frac{\sin^3\theta}{1-\cos\theta} - \frac{\cos^3\theta}{1-\sin\theta} =$

(a) $\sin\theta - \cos\theta$
(b) $\sin\theta\cos\theta$
(c) $\sin\theta + \cos\theta$
(d) $2\sin\theta$
(e) $2\cos\theta$

Which one of the following statements is FALSE?

A) $\sec\left(\frac{\pi}{2}+x\right)=\csc x$

B) $\tan\left(x-\frac{\pi}{2}\right)=-\cot x$

C) $\sin\left(\frac{\pi}{2}+x\right)=\cos x$

D) $\sin\left(\frac{\pi}{2}-x\right)=\cos x$

E) $\cos\left(\frac{\pi}{2}-x\right)=\sin(\pi-x)$`