LESSON MAKER PRO

Identity Remix

Use trig relationships to rewrite and simplify.

HIGH SCHOOL · MA.912.T.1.7

MA.912.T.1.7 "Simplify expressions using trigonometric identities."

NAME _____ DATE _____

CHOOSE AN IDENTITY

Trigonometric identities let you replace an expression with an equal expression. Use $\sin^2 x + \cos^2 x = 1$, $\tan x = \sin x/\cos x$, and reciprocal relationships such as $\sec x = 1/\cos x$ to create factors that cancel. Keep the restrictions from the original expression.

WORKED EXAMPLE

Simplify: $\tan x * \cos x$

1. Rewrite $\tan x$ as $\sin x/\cos x$.
2. $(\sin x/\cos x) * \cos x = \sin x$.

Answer: sin x

PRACTICE 6 problems

1 Simplify: $(\sin^2 x + \cos^2 x)/\sec x$

ANSWER _____

2 Simplify: $(1 - \sin^2 x)/\cos x$

ANSWER _____

3 Simplify: $\tan x/\sec x$

ANSWER _____

4 Simplify: $(\sec^2 x - 1)/\tan x$

ANSWER _____

5 Simplify: $\csc x - \sin x$

ANSWER _____

6 Simplify: $\sin x * \csc x + \cos x * \sec x$

ANSWER _____

APPLY IT Show your work

1 A phone game moves a character 8 cos x units horizontally and 8 sin x units vertically from the center. The game calculates the character's distance from the center as sqrt((8 cos x)^2 + (8 sin x)^2). What is the exact distance?

WORK SPACE

ANSWER _____

2 A virtual-reality headset uses a tilt-normalization factor N = (1 + tan^2 x)/sec^2 x. Simplify N.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Simplify: (sec x - cos x)/tan x

WORK SPACE AND ANSWER

ANSWER KEY

Identity Remix

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify: $(\sin^2 x + \cos^2 x)/\sec x$	**cos x**
2	Simplify: $(1 - \sin^2 x)/\cos x$	**cos x**
3	Simplify: $\tan x/\sec x$	**sin x**
4	Simplify: $(\sec^2 x - 1)/\tan x$	**tan x**
5	Simplify: $\csc x - \sin x$	**$\cos^2 x/\sin x$**
6	Simplify: $\sin x * \csc x + \cos x * \sec x$	**2**

PART 2 · APPLY IT

1. **8 units** Square both components and factor out 64. Use $\sin^2 x + \cos^2 x = 1$, so the distance is sqrt(64) = 8 units.
2. **1** Replace $1 + \tan^2 x$ with $\sec^2 x$. Then $\sec^2 x/\sec^2 x = 1$.

CHALLENGE

sin x

Accept algebraically equivalent forms that preserve the restrictions of the original expression. For problem 5, accept cos x cot x as equivalent to $\cos^2 x/\sin x$.