

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

CHALLENGE

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

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: $\sin x \cdot \csc x + \cos x \cdot \sec x$	2

PART 2 · APPLY IT

- 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.
- 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 $\cos^2 x/\sin x$.