

Watch. Practice. Understand. | Lesson 159

The Heart and Soul of the Trigonometric Identities Students Must Know

Watch the matching video: <https://www.youtube.com/watch?v=0AhCNuVMlyQ>

Practice focus: Fundamental trigonometric identities

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Simplify $(1 - \cos^2 x)/\sin x$ wherever defined.

02 Prove $(\sec x - \cos x)/\tan x = \sin x$ on its domain.

03 Simplify $(1 + \tan^2 x)\cos^2 x$ wherever defined.

04 A student claims $\sin(a + b) = \sin a + \sin b$. Give a counterexample.

Worked answers | Lesson 159

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01 Simplify $(1 - \cos^2 x)/\sin x$ wherever defined.

Use $1 - \cos^2 x = \sin^2 x$; result $\sin x$ for $\sin x \neq 0$.

02 Prove $(\sec x - \cos x)/\tan x = \sin x$ on its domain.

Numerator $= (1 - \cos^2 x)/\cos x = \sin^2 x/\cos x$. Divide by $\sin x/\cos x$ to obtain $\sin x$.

03 Simplify $(1 + \tan^2 x)\cos^2 x$ wherever defined.

$1 + \tan^2 x = \sec^2 x$, so the expression equals 1.

04 A student claims $\sin(a + b) = \sin a + \sin b$. Give a counterexample.

Take $a = b = \pi/2$. Left side $\sin \pi = 0$, right side $1 + 1 = 2$. The identity is false.