

Proving Pythagorean Identities with Unit Circle and Algebra

Lesson 165 | Trigonometry | Pythagorean trigonometric identities

<https://www.youtube.com/watch?v=3Cr0SE6jj0Q>

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

01

Simplify $8(1 - \cos^2 \theta) + 24\sin^2 \theta$ and name the identity.

02

Prove that $117(\sec^2 \theta - 1)/\tan \theta = 117\tan \theta$. State where the original expression is defined.

03

Prove that $156(\sec^2 \theta - 1)/\tan \theta = 156\tan \theta$. State where the original expression is defined.

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04

Simplify $12(1 - \cos^2 \theta) + 168\sin^2 \theta$ and name the identity.

05

Prove that $182(\sec^2 \theta - 1)/\tan \theta = 182\tan \theta$. State where the original expression is defined.

06

Prove that $20(\sec^2 \theta - 1)/\tan \theta = 20\tan \theta$. State where the original expression is defined.

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01

Simplify $8(1-\cos^2 \theta)+24\sin^2 \theta$ and name the identity.

Use $1-\cos^2 \theta=\sin^2 \theta$. Result $(8+24)\sin^2 \theta=32\sin^2 \theta$; valid for every real θ .

02

Prove that $117(\sec^2 \theta - 1)/\tan \theta = 117\tan \theta$. State where the original expression is defined.

$\sec^2 \theta - 1 = \tan^2 \theta$. For $\tan \theta \neq 0$, $117\tan^2 \theta / \tan \theta = 117\tan \theta$. Require $\cos \theta \neq 0$ and $\sin \theta \neq 0$; excluded angles remain excluded.

03

Prove that $156(\sec^2 \theta - 1)/\tan \theta = 156\tan \theta$. State where the original expression is defined.

$\sec^2 \theta - 1 = \tan^2 \theta$. For $\tan \theta \neq 0$, $156\tan^2 \theta / \tan \theta = 156\tan \theta$. Require $\cos \theta \neq 0$ and $\sin \theta \neq 0$; excluded angles remain excluded.

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04

Simplify $12(1 - \cos^2 \theta) + 168\sin^2 \theta$ and name the identity.

Use $1 - \cos^2 \theta = \sin^2 \theta$. Result $(12 + 168)\sin^2 \theta = 180\sin^2 \theta$; valid for every real θ .

05

Prove that $182(\sec^2 \theta - 1)/\tan \theta = 182\tan \theta$. State where the original expression is defined.

$\sec^2 \theta - 1 = \tan^2 \theta$. For $\tan \theta \neq 0$, $182\tan^2 \theta / \tan \theta = 182\tan \theta$. Require $\cos \theta \neq 0$ and $\sin \theta \neq 0$; excluded angles remain excluded.

06

Prove that $20(\sec^2 \theta - 1)/\tan \theta = 20\tan \theta$. State where the original expression is defined.

$\sec^2 \theta - 1 = \tan^2 \theta$. For $\tan \theta \neq 0$, $20\tan^2 \theta / \tan \theta = 20\tan \theta$. Require $\cos \theta \neq 0$ and $\sin \theta \neq 0$; excluded angles remain excluded.