

Trig Identities Worksheet Answer Key PDF

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Part 1: Building a Foundation

Which of the following is a Pythagorean identity?

undefined. **A) $\sin^2\theta + \cos^2\theta = 1$ ✓**

undefined. B) $\tan^2\theta + \sec^2\theta = 1$

undefined. C) $\sin \theta = 1/\cos \theta$

undefined. D) $\tan \theta = \sin \theta/\cos \theta$

The correct answer is A) $\sin^2\theta + \cos^2\theta = 1$, which is a fundamental Pythagorean identity.

Select all the reciprocal identities.

undefined. **A) $\sin \theta = 1/\csc \theta$ ✓**

undefined. **B) $\cos \theta = 1/\sec \theta$ ✓**

undefined. C) $\tan \theta = \sin \theta/\cos \theta$

undefined. **D) $\csc \theta = 1/\sin \theta$ ✓**

The correct answers are A, B, and D, which are all reciprocal identities.

Explain the significance of the identity $\tan \theta = \sin \theta/\cos \theta$ in trigonometry.

This identity shows the relationship between the sine and cosine functions and defines the tangent function in terms of these two.

List the three Pythagorean identities.

1. $\sin^2\theta + \cos^2\theta = 1$

This is the fundamental Pythagorean identity.

2. $1 + \tan^2\theta = \sec^2\theta$

This relates tangent and secant.

3. $1 + \cot^2\theta = \csc^2\theta$

This relates cotangent and cosecant.

The three Pythagorean identities are: 1) $\sin^2\theta + \cos^2\theta = 1$, 2) $1 + \tan^2\theta = \sec^2\theta$, 3) $1 + \cot^2\theta = \csc^2\theta$.

What is the reciprocal of $\tan \theta$?

undefined. A) $\sin \theta$

undefined. B) $\cos \theta$

undefined. C) $\cot \theta$ ✓

undefined. D) $\sec \theta$

The correct answer is C) $\cot \theta$, which is the reciprocal of tangent.

Part 2: Application and Analysis

Which identity can be used to express $\cos(2\theta)$ in terms of $\sin \theta$ only?

undefined. A) $\cos(2\theta) = \cos^2\theta - \sin^2\theta$

undefined. B) $\cos(2\theta) = 2\cos^2\theta - 1$

undefined. C) $\cos(2\theta) = 1 - 2\sin^2\theta$ ✓

undefined. D) $\cos(2\theta) = \sin(2\theta)$

The correct answer is C) $\cos(2\theta) = 1 - 2\sin^2\theta$, which expresses cosine in terms of sine.

Identify the angle sum identities.

undefined. A) $\sin(a + b) = \sin a \cos b + \cos a \sin b$ ✓

undefined. B) $\cos(a + b) = \cos a \cos b - \sin a \sin b$ ✓

undefined. C) $\tan(a + b) = (\tan a + \tan b)/(1 - \tan a \tan b)$ ✓

undefined. D) $\sin(a - b) = \sin a \cos b - \cos a \sin b$ ✓

The correct answers are A, B, C, and D, which are all angle sum identities.

Solve for θ if $\cos(2\theta) = 1/2$ and θ is in the first quadrant.

To solve for θ , you can use the identity $\cos(2\theta) = 1/2$ and find the corresponding angle in the first quadrant.

Which identity is used to transform $\sin a \sin b$ into a sum?

undefined. A) Product-to-Sum Identity ✓

undefined. B) Sum-to-Product Identity

undefined. C) Double Angle Identity

undefined. D) Reciprocal Identity

The correct answer is A) Product-to-Sum Identity, which transforms products of sine functions into sums.

Which of the following expressions can be simplified using the identity $\sin^2\theta + \cos^2\theta = 1$?

undefined. A) $\sin^2\theta + \cos^2\theta$ ✓

undefined. B) $\tan^2\theta + 1$ ✓

undefined. C) $\sec^2\theta - \tan^2\theta$ ✓

undefined. D) $\cot^2\theta + 1$

The correct answers are A, B, and C, which can all be simplified using the Pythagorean identity.

Part 3: Evaluation and Creation

Which identity is essential for proving that $\tan(a + b) = (\tan a + \tan b)/(1 - \tan a \tan b)$?

undefined. A) Angle Sum Identity for Sine ✓

undefined. B) Angle Sum Identity for Cosine

undefined. C) Double Angle Identity for Tangent

undefined. D) Reciprocal Identity

The correct answer is A) Angle Sum Identity for Sine, which is used in the proof of the tangent sum identity.

Evaluate the following statements and select those that are true regarding half-angle identities.

undefined. A) They can be derived from double angle identities. ✓

undefined. B) They are useful for finding exact values of trigonometric functions at specific angles. ✓

undefined. C) They are primarily used in calculus for integration.

undefined. D) They are equivalent to the reciprocal identities.

The correct answers are A and B, which are true statements about half-angle identities.

Create a real-world problem that involves using the sum-to-product identities to simplify an expression. Provide a detailed solution.

Students should create a problem that applies sum-to-product identities and provide a clear solution.

Propose a method to verify the identity $\sin(2\theta) = 2\sin \theta \cos \theta$ using basic trigonometric identities.

1. Step 1: Use the angle sum identity for sine.

$$\sin(2\theta) = \sin(\theta + \theta) = \sin \theta \cos \theta + \cos \theta \sin \theta.$$

2. Step 2: Factor out the common terms.

This gives $2\sin \theta \cos \theta$.

Students should outline a method that involves using the angle sum identity to verify the double angle identity for sine.