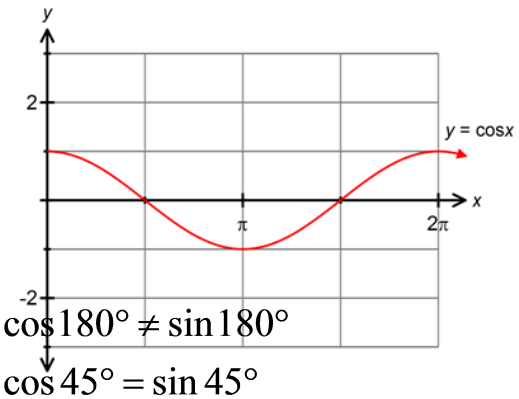
CHAPTER 6

Trigonometric Identities

What is the difference between a trigonometric equation and a trigonometric identity?

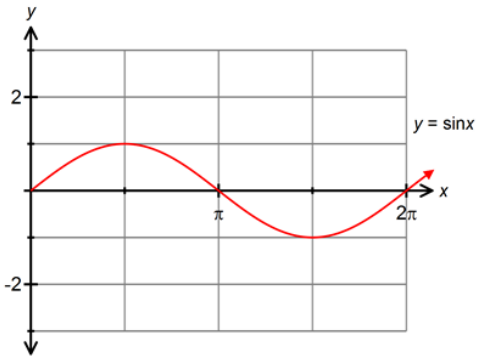
Example 1: $\cos x = \sin x$ ⟵ trigonometric equation

↳ holds true for no x values, some values or all values



$\cos 180° \neq \sin 180°$

$\cos 45° = \sin 45°$



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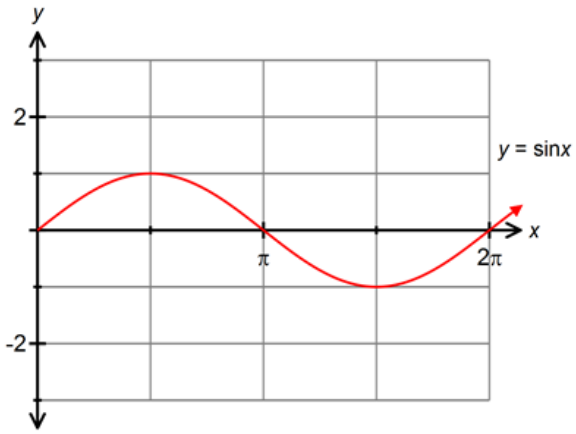
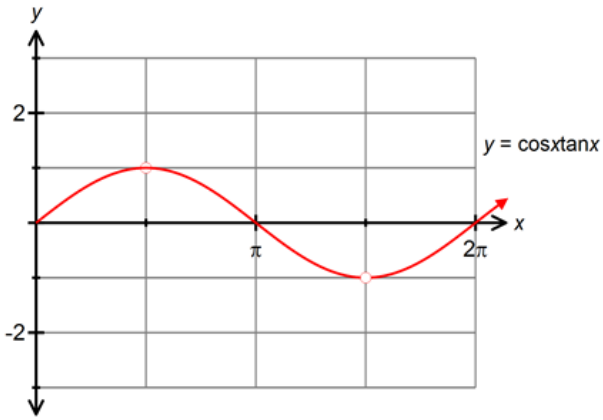
Example 2: $\sin x = \cos x \tan x$ ⟵ **Trigonometric Identity**

↳ a special type of trigonometric equation

↳ the equation is true for <u>all</u> x-values where it is defined (permissible values)





<u>Prove Algebraically:</u>

Restrictions on the tangent function.

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Section 6.1 Reciprocal, Quotient, and Pythagorean Identities

Reciprocal Identities

$\csc\theta$ $\sec\theta$ $\cot\theta$

Quotient Identities

$\tan\theta$ $\cot\theta$

Use Identities to Simplify Expressions and Equations

Example 3: Simplify and state the restrictions: $\dfrac{\sec x}{\tan x}$

simplify the expression
in terms of sine or cosine

Simplify:

Restrictions:

→

Example 4: Simplify and state the restrictions: $\dfrac{\cot x}{\csc x \cos x}$

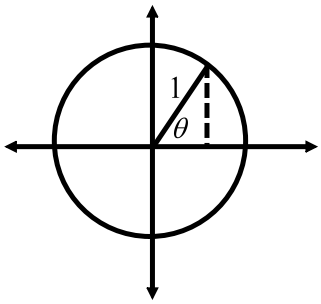
Simplify:

Restrictions:

Pythagorean Identities

$\cos^2\theta + \sin^2\theta = 1$ $\quad\quad$ $\cot^2\theta + 1 = \csc^2\theta$ $\quad\quad$ $1 + \tan^2\theta = \sec^2\theta$

Proof: $\cos^2\theta + \sin^2\theta = 1$



Other Proofs:

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

Example 5: Simplify $(\sin x + \cos x)^2 + (\sin x - \cos x)^2$

Example 6: Simplify $\dfrac{1 - \sin^2 x}{\cos x}$

Example 7: Simplify $\csc x - \dfrac{\cot x}{\sec x}$

Example 8: Show that $\dfrac{\cot x}{\sec x} + \sin x = \csc x$

★ Example 9: Show that $\dfrac{\sin x \cos x}{1 + \cos x} = \dfrac{1 - \cos x}{\tan x}$

Assign p.296-297 #1, 3, 4, 10