

Getting to Know
the Basic Trig Identities

Name Key

List all identities equivalent to the given trig function.

1. $\sin x = \frac{1}{\csc x}$

$\sin x = \cos\left(\frac{\pi}{2} - x\right)$

2. $\cos x = \frac{1}{\sec x}$

$\cos x = \sin\left(\frac{\pi}{2} - x\right)$

$\cos x = \cos(-x)$

3. $\tan x = \frac{1}{\cot x}$

$\tan x = \cot\left(\frac{\pi}{2} - x\right)$

$\tan x = \frac{\sin x}{\cos x}$

4. $\csc x = \frac{1}{\sin x}$

$\csc x = \sec\left(\frac{\pi}{2} - x\right)$

5. $\sec x = \frac{1}{\cos x}$

$\sec x = \csc\left(\frac{\pi}{2} - x\right)$

$\sec x = \sec(-x)$

6. $\cot x = \frac{1}{\tan x}$

$\cot x = \tan\left(\frac{\pi}{2} - x\right)$

$\cot x = \frac{\cos x}{\sin x}$

Fill in the blanks and/or complete each trig identity.

7. $\sin^2 x + \cos^2 x = 1$

8. $\sin(\cot x) = \cos x$ $\sin x \cot x = \frac{\cos x}{\sin x} \cdot \sin x$

9. $\frac{\sin x}{\cos x} = \tan x$

10. $\sin(-x) = -\sin x$

11. $\sec^2 x = \frac{1}{\cos^2 x}$

12. $\frac{1}{\cos x} = \sec x$

Other identities can be formed by rearranging the basic trig identities.

Fill in the blanks to create other identities that you did not already list on the front side!

13. $\sin^2 x = 1 - \cos^2 x$

14. $\sin x = -\sin(-x)$

$\sin(-x) = -\sin x$
 $-\sin(-x) = \sin x$

15. $\sin x = (\cos x) \cdot (\tan x)$

16. $\tan^2 x = \sec^2 x - 1$

$\cos x \cdot \tan x = \frac{\sin x}{\cos x} \cdot \cos x$

17. $\sin x = \frac{(\cos x)}{(\cot x)} \sin x \cot x = \frac{\cos x \sin x}{\sin x}$
 $\frac{\sin x \cot x}{\cot x} = \frac{\cos x}{\cot x}$

17. $1 + \cot^2 x = \csc^2 x$

By manipulating the basic trig identities, you can create nine expressions that are equivalent to 1!
 Write these 9 identities that are all equivalent to 1.

$\cot x \cdot \tan x = \frac{1}{\cot x} \cdot \cot x$

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

$\cot x \cdot \tan x = 1$

$1 + \tan^2 x = \sec^2 x$
 $-\tan^2 x \quad -\tan^2 x$

$\sin x \cdot \csc x = \frac{1}{\sin x} \cdot \sin x$

$\sec^2 x - \tan^2 x = 1$

$\sin x \cdot \csc x = 1$

$1 + \cot^2 x = \csc^2 x$
 $-\cot^2 x \quad -\cot^2 x$

$\cos x \cdot \sec x = \frac{1}{\cos x} \cdot \cos x$

$\csc^2 x - \cot^2 x = 1$

$\cos x \cdot \sec x = 1$

$\csc x \cdot \sin x = \frac{1}{\csc x} \cdot \csc x$

$\tan x \cdot \cot x = \frac{1}{\tan x} \cdot \tan x$

$\csc x \cdot \sin x = 1$

$\tan x \cdot \cot x = 1$

$\sec x \cdot \cos x = \frac{1}{\sec x} \cdot \sec x$

$\sec x \cdot \cos x = 1$

same though
 same though

same though