

Practice 8.1: Fundamental Trig Identities

1. Use the Fundamental Trig Identities to evaluate the other trig functions (sec, csc, tan, cot, etc) for the same angle.

a. $\sin x = \frac{1}{2}$ $\cos x = \frac{\sqrt{3}}{2}$ b. $\csc \theta = \frac{5}{3}$ $\tan x = \frac{3}{4}$

c. $\cos x = \frac{12}{13}$ $\cos(90^\circ - x) = \frac{5}{13}$ d. $\tan \theta = \frac{5}{3}$ $\sin \theta < 1$

2. Simplify the trig expressions so that they equal one of the following.

(I) -1 (II) $\cos x$ (III) $\cot x$ (IV) 1 (V) $-\tan x$ (VI) $\sin x$

a. $\sec x \cos x$ b. $\frac{\sin(-x)}{\cos(-x)}$

c. $\tan^2 x - \sec^2 x$ d. $\frac{1 - \cos^2 x}{\sin x}$

e. $\cot x \sin x$ f. $\frac{\sin(90^\circ - x)}{\cos(90^\circ - x)}$

3. Simplify the trig expressions so that they equal one of the following.

(I) $\csc x$ (II) $\tan x$ (III) $\sin^2 x$ (IV) $\sin x \tan x$ (V) $\sec^2 x$ (VI) $\sec^2 x + \tan^2 x$

a. $\sin x \sec x$

b. $\cos^2 x (\sec^2 x - 1)$

c. $\frac{\sec^2 x - 1}{\sin^2 x}$

d. $\cot x \sec x$

e. $\sec^4 x - \tan^4 x$

f. $\frac{\cos^2(90^\circ - x)}{\cos(x)}$

4. Use the Fundamental Trig Identities to simplify the following expressions.

a. $\tan \alpha \csc \alpha$

b. $\sin \beta (\csc \beta - \sin \beta)$

c. $\cos \gamma \tan \gamma$

d. $\sec \phi \frac{\sin \phi}{\tan \phi}$

e. $\frac{\cot \delta}{\csc \delta}$

f. $\frac{\csc \omega}{\sec \omega}$

g. $\sec^2 \sigma (1 - \sin^2 \sigma)$

h. $\frac{1}{\tan^2 \lambda + 1}$