

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.  $\frac{\sec^2 x - 1}{\sin^2 x} = \frac{\tan^2 x}{\sin^2 x} = \tan^2 x \cdot \frac{1}{\sin^2 x}$

d.  $\cot x \sec x$

(V)

$\sec^2 x \leftarrow \frac{1}{\cos^2 x} \leftarrow \frac{\sin^2 x}{\cos^2 x} \cdot \frac{1}{\sin^2 x}$

e.  $\sec^4 x - \tan^4 x$  (VI)  
factor

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

$(\sec^2 x + \tan^2 x)(\sec^2 x - \tan^2 x)$

$(\sec^2 x + \tan^2 x)(\sec^2 x - (\sec^2 x - 1)) = \sec^2 x + \tan^2 x$

Sorry,  
you can  
replace the  
Greek letters  
with  $ax$

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

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

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

$\sin \beta \csc \beta - \sin^2 \beta$   
 $\sin \beta \frac{1}{\sin \beta} - \sin^2 \beta$   
 $1 - \sin^2 \beta = \cos^2 \beta$

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

d.  $\sec \phi \frac{\sin \phi}{\tan \phi} = \sec x \cdot \sin x \cdot \frac{1}{\tan x}$

$1 \leftarrow \tan x \cdot \frac{1}{\tan x} \leftarrow \frac{1}{\cos x} \cdot \sin x \cdot \frac{1}{\tan x}$

e.  $\frac{\cot \delta}{\csc \delta} = \cot x \cdot \frac{1}{\csc x} = \frac{\cos x}{\sin x} \cdot \sin x$  f.  $\frac{\csc \omega}{\sec \omega}$

$\downarrow$   
 $\cos x$

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

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