11.4 Trig Identities

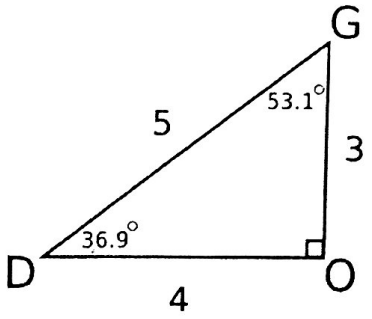
1) Identify each trig ratio.

cos(36.9)= $\frac{4}{5}$

sin(36.9)= $\frac{3}{5}$

cos(53.1)= $\frac{3}{5}$

sin(53.1)= $\frac{4}{5}$



Write down the equivalent ratios:

$\cos(36.9) = \sin(53.1)$ $\sin(36.9) = \cos(53.1)$

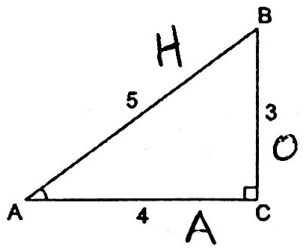
What do you notice about the angle measures of the equivalent trig values? Angles add to 90°

Complimentary Identity	
$\sin\theta = \cos(90-\theta)$	$\cos\theta = \sin(90-\theta)$

2) Find the equivalent sine or cosine.

a. cos(61)= sin29 b. sin(75)= cos15 c. sin(36)= cos54

3) Find each ratio.



a. sin(A)= $\frac{3}{5}$

b. cos(A)= $\frac{4}{5}$

c. tan(A)= $\frac{3}{4}$

d. $\frac{\sin(A)}{\cos(A)} = \frac{\frac{3}{5}}{\frac{4}{5}} = \frac{3}{5} \cdot \frac{5}{4} = \boxed{\frac{3}{4}}$

Tangent Identity
$\tan\theta = \frac{\sin\theta}{\cos\theta}$
When simplifying, switch $\tan\theta$ to $\frac{\sin\theta}{\cos\theta}$ and go from there.

4) Simplify each expression.

a. $\cos x * \tan x$

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

b. $\frac{1}{\sin x} * \tan x$

$\frac{1}{\sin x} \cdot \frac{\sin x}{\cos x} = \boxed{\frac{1}{\cos x}}$

c. $\frac{\sin x}{\tan x} = \frac{\sin x}{\frac{\sin x}{\cos x}} = \frac{\sin x}{1} \cdot \frac{\cos x}{\sin x} = \boxed{\cos x}$

(Flip & multiply)

d. $\frac{\sin^2 x}{\cos^2 x} = \boxed{\tan^2 x}$

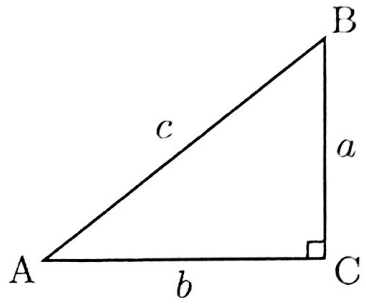
Pythagorean Identity

There are main ways that you will see this identity:

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

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

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



3) Simplify the following.

a. $\frac{1-\cos^2 x}{\sin x} = \frac{\sin^2 x}{\sin x}$

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

b. $\frac{1-\cos^2 x}{1-\sin^2 x} = \frac{\sin^2 x}{\cos^2 x} = \tan^2 x$

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

d. $\frac{1-\sin^2 x}{\cos x} = \frac{\cos^2 x}{\cos x}$

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

e. $(\sin^2 x + \cos^2 x) * \cos^2 x$

$1 \cdot \cos^2 x = \cos^2 x$

f. $\frac{\sin^2 x + \cos^2 x}{\cos x} * \sin x$

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