Pre-Calculus Notes Name: _____

Section 5.4 - Sum and Difference Formulas

Example 1: True or False? Try it out with your calculator.

a. $\cos 55° = \cos 20° + \cos 35°$	b. $\sin 20° = \sin(90° - 70°)$

Note: We will generally use the following formulas to find ***EXACT*** function values for angles other than $30°, 45°, or\ 60°$.

Refer to your formula sheet for the Sum and Difference Formulas.

Example 2: Express each angle in terms of the sine, cosine, or tangent of one angle.

a. $\cos 20°\cos 35° - \sin 20°\sin 35°$	b. $\cos\frac{7\pi}{6}\cos\frac{5\pi}{6} + \sin\frac{7\pi}{6}\sin\frac{5\pi}{6}$
c. $\sin 40°\cos 35° - \cos 40°\sin 35°$	d. $\frac{\tan 140° - \tan 60°}{1 + (\tan 140°)(\tan 60°)}$

Example 3: Use the identities to find the EXACT value of the expression

a. $\cos 15°\cos 60° + \sin 15°\sin 60°$	b. $\frac{\tan\left(\frac{5\pi}{4}\right) - \tan\left(\frac{\pi}{12}\right)}{1 + \tan\left(\frac{5\pi}{4}\right)\tan\left(\frac{\pi}{12}\right)}$

Use the formulas above to find the ***EXACT VALUES*** for the following functions:

Ex. 4) $\cos(75°) = \cos(\_\_\_\_\_ + \_\_\_\_\_) =$

Ex. 5) $\sin\left(\frac{5\pi}{12}\right) = \sin\left(\_\_\_\_ + \_\_\_\_\right) =$

Ex.6) $\sin(195°) = \sin(\_\_\_\_\_ + \_\_\_\_\_)$ *or* $\sin(\_\_\_\_\_ - \_\_\_\_\_)$

Ex. 7) $\sin\left(\frac{-7\pi}{12}\right) =$ _____

Ex. 8) $\tan\left(\frac{-7\pi}{12}\right) =$ _____

Example 9) Given $0 < \alpha < \frac{\pi}{2}$ with $\cos\alpha = \frac{3}{5}$, and $\frac{\pi}{2} < \beta < \pi$ with $\sin\beta = \frac{5}{13}$.

Find the following EXACT VALUES.

$\sin\alpha$	$\cos\beta$	$\tan\alpha$	$\tan\beta$
$\cos(\alpha+\beta)$		$\cos(\alpha-\beta)$	
$\sin(\alpha-\beta)$		$\sin(\alpha+\beta)$	
$\tan(\alpha-\beta)$		$\sec(\alpha+\beta)$	
$\cot(\alpha-\beta)$		$\csc(\alpha-\beta)$	