Section 6.2
Sum and Difference Formulas

Sum and difference formulas

$\cos(A+B)=\cos A*\cos B-\sin A*\sin B$ $\quad\quad$ $\sin(A+B)=\sin A*\cos B+\cos A*\sin B$

$\cos(A-B)=\cos A*\cos B+\sin A*\sin B$ $\quad\quad$ $\sin(A-B)=\sin A*\cos B-\cos A*\sin B$

$$\tan(A+B)=\frac{\tan A+\tan B}{1-\tan A\tan B}$$

$$\tan(A-B)=\frac{\tan A-\tan B}{1+\tan A\bullet\tan B}$$

EXAMPLES - In each case use a sum or difference formula.

1) $\cos\left(\frac{\pi}{4}+\frac{\pi}{3}\right)$ NOTE: You will have found the $\cos\left(\frac{7\pi}{12}\right)$ - not one of our "special values".

2) Given $\cos\alpha=-\frac{1}{2}$, $\frac{\pi}{2}<\alpha<\pi$, and $\sin\beta=\frac{1}{3}$, $\frac{\pi}{2}<\beta<\pi$, find the exact value of $\sin(\alpha-\beta)$.

3) $\tan\left(x+\frac{\pi}{4}\right)$ NOTE: In this problem you will not use your special angle values.

4) $\cos\left(\frac{\pi}{6}-x\right)$ NOTE: In this problem you WILL use your special angle values.

5) $\cos 20°\cos 40° - \sin 20° \sin 40°$

6) $\dfrac{\tan 45^\circ + \tan 15^\circ}{1 - \tan 45^\circ \tan 15^\circ}$

7) Given $\sin\alpha = \dfrac{\sqrt{20}}{5}, 0 < \alpha < \dfrac{\pi}{2}$ *and* $\sin\beta = \dfrac{4}{5}, \dfrac{\pi}{2} < \beta < \pi$, find tan ($\alpha$ - β).

8) Complete the following identity: $\sin\left(\frac{7\pi}{2} - x\right)$

a) $\sin x$
b) $\sin \frac{3\pi}{2}$ - $\sin x$
c) $-\cos x$
d) $\cos x$