5.4 Sum and Difference Formulas

Sum and Difference Formulas

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

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

$\cos 75° =$

30
45

120
−45

$\cos 30° \cos 45° - \sin 30 \sin 45°$

$\frac{\sqrt{3}}{2} \frac{\sqrt{2}}{2} - \frac{1}{2} \frac{\sqrt{2}}{2}$

$\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \frac{\sqrt{6}-\sqrt{2}}{4}$

$\cos(5\pi/12) =$

$\frac{3\pi}{12} + \frac{2\pi}{12}$

$\frac{\pi}{4} + \frac{\pi}{6}$

$\cos\frac{\pi}{4}\cos\frac{\pi}{6} - \sin\frac{\pi}{4}\sin\frac{\pi}{6}$

$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$

$\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \frac{\sqrt{6}-\sqrt{2}}{4}$

Sum and Difference Formulas

$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$

$$\sin(A-B) = \sin A \cos B - \cos A \sin B$$

$$\sin\frac{23\pi}{12} =$$

$\frac{20\pi}{12} + \frac{3\pi}{12}$

$\frac{5\pi}{3} + \frac{\pi}{4}$

$\sin\frac{5\pi}{3}\cos\frac{\pi}{4} + \cos\frac{5\pi}{3}\sin\frac{\pi}{4}$

$-\frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2} + \frac{1}{2}\cdot\frac{\sqrt{2}}{2}$

$-\frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$

$\frac{-\sqrt{6}+\sqrt{2}}{4}$

$\sin 255° =$

$225 \quad (45)$
$+\ 30 \quad (30)$

$\sin 225 \cos 30 + \cos 225 \sin 30$

$-\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + -\frac{\sqrt{2}}{2} \cdot \frac{1}{2}$

$-\frac{\sqrt{6}}{4} + -\frac{\sqrt{2}}{4}$

$\frac{-\sqrt{6}-\sqrt{2}}{4}$

Sum and Difference Formulas

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

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

$\tan 105° =$

60
45

$$\frac{\tan 60 + \tan 45}{1 - \tan 60 \tan 45}$$

$$\frac{\sqrt{3} + 1 \quad (1+\sqrt{3})}{1 - \sqrt{3} \quad (1+\sqrt{3})}$$

$$\frac{\sqrt{3} + 1 + 3 + \sqrt{3}}{1 + \sqrt{3} - \sqrt{3} - 3}$$

$$\frac{4 + 2\sqrt{3}}{-2} = -2 - \sqrt{3}$$

Find sin (u+v) given the following information.

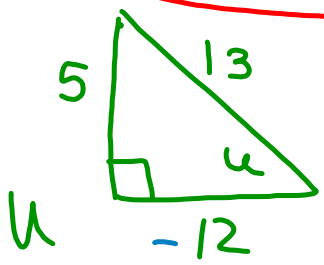
$$\sin u = \frac{5}{13}$$

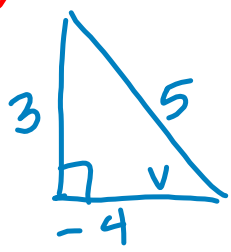
$$\cos v = \frac{-4}{5}$$

$\sin u \cos v + \cos u \sin v$

$\left(\frac{5}{13}\right)\left(\frac{-4}{5}\right) + \left(\frac{-12}{13}\right)\left(\frac{3}{5}\right)$

u,v lie in Quadrant II





$\frac{-20 + -36}{65}$

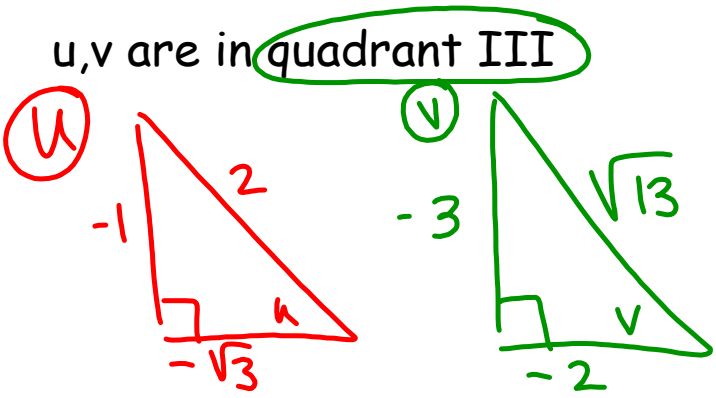
$-\frac{56}{65}$

Find cos (u+v) given the following information.

$$\sin u = -\frac{1}{2}$$

$$\tan v = \frac{3}{2}$$

u,v are in quadrant III



$\cos u \cos v - \sin u \sin v$

$\frac{-\sqrt{3}}{2} \cdot \frac{-2}{\sqrt{13}} - \frac{-1}{2} \cdot \frac{-3}{\sqrt{13}}$

$\frac{6}{2\sqrt{13}} - \frac{3}{2\sqrt{13}}$

$\frac{9}{2\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = \frac{9\sqrt{13}}{13}$