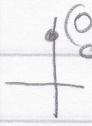
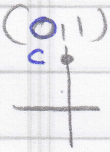
1. $\sin 75^\circ \cos 15^\circ + \cos 75^\circ \sin 15^\circ = \sin(75^\circ + 15^\circ)$



$= \sin 90^\circ = 1$

chg sign

3. $\cos\frac{5\pi}{12}\cos\frac{\pi}{12} - \sin\frac{5\pi}{12}\sin\frac{\pi}{12} = \cos\left(\frac{5\pi}{12} \oplus \frac{\pi}{12}\right)$



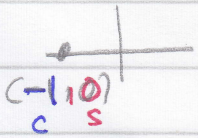
$= \cos\frac{6\pi}{12} = \cos\frac{\pi}{2} = 0$

5. $\sin 3x \cos 2x - \cos 3x \sin 2x = \sin(3x - 2x) = \sin x$

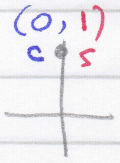
7. $\sin(x \oplus \pi) = -\sin x$

$\sin x \cos\pi \oplus \cos x \sin\pi =$

$\sin x\,(-1) + \cos x\,(0) = -\sin x$



9. $\cos\left(x \oplus \frac{\pi}{2}\right) = -\sin x$



$\cos x \cos\frac{\pi}{2} \ominus \sin x \sin\frac{\pi}{2}$

$\cos x\,(0) \ominus \sin x\,(1) = -\sin x$

13. $\cos 75^\circ = \cos(45^\circ \oplus 30^\circ)$

$= \cos 45^\circ \cos 30^\circ \ominus \sin 45^\circ \sin 30^\circ$

$= \frac{\sqrt{2}}{2}\cdot\frac{\sqrt{3}}{2} \ominus \frac{\sqrt{2}}{2}\cdot\frac{1}{2} = \frac{\sqrt{6} - \sqrt{2}}{4}$

15. $\cos 105^\circ = \cos(60^\circ \oplus 45^\circ)$

$= \cos 60^\circ \cos 45^\circ \ominus \sin 60^\circ \sin 45^\circ$

$= \frac{1}{2}\cdot\frac{\sqrt{2}}{2} \ominus \frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2} = \frac{\sqrt{2} - \sqrt{6}}{4}$

17 $\sin(-15°) = \sin(30° - 45°)$

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

$\frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} = \frac{\sqrt{2} - \sqrt{6}}{4}$

19 $\sin \frac{7\pi}{12} = \sin\left(\frac{4\pi}{12} + \frac{3\pi}{12}\right) = \sin\left(\frac{\pi}{3} + \frac{\pi}{4}\right)$

$\sin \frac{\pi}{3} \cos \frac{\pi}{4} + \cos \frac{\pi}{3} \sin \frac{\pi}{4} = \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} + \frac{1}{2} \cdot \frac{\sqrt{2}}{2} = \frac{\sqrt{6} + \sqrt{2}}{4}$

21 $\sin(30° + \theta) + \sin(30° - \theta)$

$\sin 30° \cos\theta + \cos 30° \sin\theta + \sin 30° \cos\theta - \cos 30° \sin\theta$

$\frac{1}{2} \cos\theta + \frac{1}{2} \cos\theta = \cos\theta$

23 $\cos\left(\frac{\pi}{3} + x\right) + \cos\left(\frac{\pi}{3} - x\right)$

$\cos \frac{\pi}{3} \cos x - \sin \frac{\pi}{3} \sin x + \cos \frac{\pi}{3} \cos x + \sin \frac{\pi}{3} \sin x$

$\frac{1}{2} \cos x + \frac{1}{2} \cos x = \cos x$

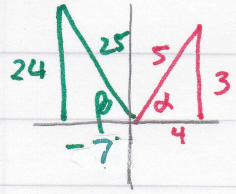
25 $\cos\left(\frac{3\pi}{2} + x\right) + \cos\left(\frac{3\pi}{2} - x\right)$

$\cos \frac{3\pi}{2} \cos x - \sin \frac{3\pi}{2} \sin x + \cos \frac{3\pi}{2} \cos x + \sin \frac{3\pi}{2} \sin x$

$0 \cos x + 0 \cos x = 0$

$(0, -1)$
$C \quad S$

27



$\sin\alpha = \frac{3}{5}$ $\quad \sin\beta = \frac{24}{25}$

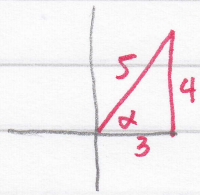
$\cos\alpha = \frac{4}{5}$ $\quad \cos\beta = \frac{-7}{25}$

$\sin(\alpha + \beta) = \sin\alpha \cos\beta + \cos\alpha \sin\beta$

$= \frac{3}{5}\left(-\frac{7}{25}\right) + \frac{4}{5}\left(\frac{24}{25}\right)$

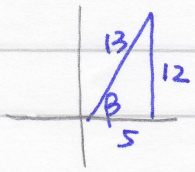
$= \frac{-21 + 96}{125} = \frac{75}{125} = \frac{3}{5}$

29.



$\sin\alpha = \frac{4}{5}$

$\cos\alpha = \frac{3}{5}$



$\sin\beta = \frac{12}{13}$

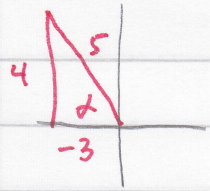
$\cos\beta = \frac{5}{13}$

$\cos(\alpha \ominus \beta) = \cos\alpha\ \cos\beta \oplus \sin\alpha\ \sin\beta$

$\frac{3}{5} \cdot \frac{5}{13} \oplus \frac{4}{5} \cdot \frac{12}{13}$

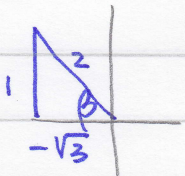
$= \frac{15+48}{65} = \frac{63}{65}$

28



$\sin\alpha = \frac{4}{5}$

$\cos\alpha = -\frac{3}{5}$



$\sin\beta = \frac{1}{2}$

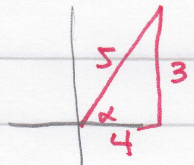
$\cos\beta = -\frac{\sqrt{3}}{2}$

$\sin(\alpha \ominus \beta) = \sin\alpha\ \cos\beta \ominus \cos\alpha\ \sin\beta$

$\frac{4}{5} \cdot -\frac{\sqrt{3}}{2} \ominus -\frac{3}{5} \cdot \frac{1}{2}$

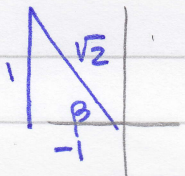
$\frac{-4\sqrt{3}+3}{10}$

30



$\sin\alpha = \frac{3}{5}$

$\cos\alpha = \frac{4}{5}$



$\sin\beta = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\cos\beta = \frac{-1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$

$\cos(\alpha \oplus \beta) = \cos\alpha\ \cos\beta \ominus \sin\alpha\ \sin\beta$

$\frac{4}{5}\left(\frac{-\sqrt{2}}{2}\right) \ominus \frac{3}{5}\left(\frac{\sqrt{2}}{2}\right)$

$\frac{-4\sqrt{2}-3\sqrt{2}}{10} = \frac{-7\sqrt{2}}{10}$