

$$4b) (6 \cos^2 24^\circ - 6 \sin^2 24^\circ) \tan 48^\circ$$

$$* \cos 2A = \cos^2 A - \sin^2 A$$

$$6 (\cos^2 24^\circ - \sin^2 24^\circ) \tan 48^\circ$$

$$6 (\cos 48^\circ) \tan 48^\circ$$

$$6 \cancel{\cos 48^\circ} \frac{\sin 48^\circ}{\cancel{\cos 48^\circ}}$$

$$6 \sin 48^\circ$$

$$1e) 8 \sin \frac{\pi}{3} \cos \frac{\pi}{3}$$

$$\sin 2A = 2 \sin A \cos A$$

$$4 \left(2 \sin \frac{\pi}{3} \cos \frac{\pi}{3} \right)$$

$$4 \left(\sin 2 \left(\frac{\pi}{3} \right) \right)$$

$$4 \sin \frac{2\pi}{3}$$

$$5a) \frac{\sin 2\theta}{2 \cos \theta} \rightarrow * \begin{aligned} \sin 2A &= 2 \sin A \cos A \\ \sin 2\theta &= 2 \sin \theta \cos \theta \end{aligned}$$

$$\frac{2 \sin \theta \cos \theta}{2 \cancel{\cos \theta}}$$

$$= \sin \theta$$

$$b) \cos 2x \cos x + \sin 2x \sin x$$

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

$$\frac{\cos(2x - x)}{\cos x}$$

$$8a) \cos 75^\circ$$

$$\cos(45^\circ + 30^\circ)$$

Identity

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

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

$$= \left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) - \left(\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right)$$

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

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

8b)

$$\tan 165^\circ$$

$$\tan(135^\circ + 30^\circ)$$

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

$$= \frac{\tan 135^\circ + \tan 30^\circ}{1 - \tan 135^\circ \tan 30^\circ}$$

$$= \frac{-1 + \frac{\sqrt{3}}{3}}{1 - (-1)\left(\frac{\sqrt{3}}{3}\right)}$$

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

$$= \frac{-3+\sqrt{3}}{\cancel{3}} \cdot \frac{\cancel{3}}{3+\sqrt{3}}$$

$$= \frac{-3+\sqrt{3}}{3+\sqrt{3}} \cdot \frac{3-\sqrt{3}}{3-\sqrt{3}}$$

$$= \frac{-9 + 3\sqrt{3} + 3\sqrt{3} - 3}{9 - 3}$$

$$= \frac{-12 + 6\sqrt{3}}{6} = \boxed{-2 + \sqrt{3}}$$

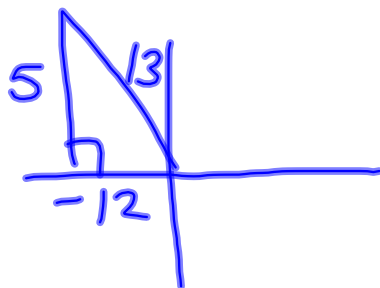
$$\frac{\sin 30^\circ}{\cos 30^\circ} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{\sqrt{3}}$$

11. Quadrant II

$\sin \theta = \frac{5}{13}$. Determine the EXACT value for:

a) $\cos 2\theta$

$$* \cos 2\theta = \cos^2 \theta - \sin^2 \theta$$



$$= \left(-\frac{12}{13}\right)^2 - \left(\frac{5}{13}\right)^2$$

$$= \left(\frac{144}{169}\right) - \left(\frac{25}{169}\right)$$

$$= \frac{119}{169}$$

ex. 2)

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

$$\tan x = \frac{1 - (1 - 2\sin^2 x)}{2\sin x \cos x} \quad | -1 + 2\sin^2 x$$

$$\tan x = \frac{\cancel{2} \sin^2 x \sin x}{\cancel{2} \sin x \cos x}$$

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

$$\tan x = \tan x$$