

Section 1: The compound angle identities

Exercise level 2

1. Simplify $\cos A \cos(A - B) + \sin A \sin(A - B)$.
2. Solve the following equations in the range $0^\circ \leq x \leq 360^\circ$.
 - (i) $1 - 2 \sin x - 4 \cos 2x = 0$
 - (ii) $\sin 2x - \tan x = 0$
 - (iii) $\tan 2x + \tan x = 0$
3. Prove that:
 - (i) $\cos^4 x - \sin^4 x \equiv \cos 2x$
 - (ii) $\frac{\cos x - \sin x}{\cos x + \sin x} = \frac{\cos 2x}{1 + \sin 2x}$
 - (iii) $\frac{\cot^2 x - 1}{\cot^2 x + 1} = \cos 2x$
 - (iv) $\frac{\sin x}{1 + \cos x} + \frac{1 - \cos x}{\sin x} \equiv 2 \tan \frac{x}{2}$
4. Solve $\sin 3x = \sin x$ for angles between 0° and 180° .