SUM AND DIFFERENCE OF TWO ANGLES

2 Simplify:

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

(b) $\cos(\theta + \alpha)\cos(\theta - \alpha) + \sin(\theta + \alpha)\sin(\theta - \alpha)$

(c) $\sin 2A \cos A - \cos 2A \sin A$

(d) $\cos 60° \cos 30° - \sin 60° \sin 30°$

2 Simplify:

(e) $\dfrac{\tan\theta - \tan 20°}{1 + \tan 20° \tan\theta}$ **(f)** $\dfrac{\tan 2\alpha + \tan\alpha}{1 - \tan 2\alpha \tan\alpha}$ **(g)** $\sin(2A + B)\cos(A + B) - \cos(2A + B)\sin(A + B)$

(h) $\cos(3\theta + \alpha)\cos(2\theta + \alpha) + \sin(3\theta + \alpha)\sin(\theta + \alpha)$ **(i)** $\dfrac{\tan 3x - \tan x}{1 + \tan 3x \tan x}$

4 **(a)** Find the exact value of $\sin 38° \cos 22° + \cos 38° \sin 22°$.

(b) Find the exact value of $\dfrac{\tan 119° + \tan 16°}{1 - \tan 119° \tan 16°}$.

(c) Find the exact value of $\cos 165°$.

(d) Expand and simplify $\sin(x + 40°) + \sin(x - 40°)$.

6 Write the expansion of $\cos(\theta - \phi)$. Write $(90° - \theta)$ in place of θ to deduce the expansion of $\sin(\theta + \phi)$.

7 If θ and ϕ are angles between 0° and 90°, $\sin\theta = \frac{3}{5}$, $\tan\phi = \frac{7}{24}$, find the following without using a calculator.

(a) $\sin(\theta - \phi)$ **(b)** $\cos(\theta + \phi)$ **(c)** $\tan(\theta - \phi)$

10 **(a)** Using the expansion of $\sin(A+B)$, prove that $\sin 75° = \dfrac{\sqrt{6}+\sqrt{2}}{4}$.

(b) Using the expansion of $\tan(A+B)$, prove that $\tan 75° = 2+\sqrt{3}$.

11 Find the value (in simplest surd form) of:

(a) $\cos 75°$ **(b)** $\tan 15°$ **(c)** $\cos 15°$