5 Find

a $\int \sin^2 x \, dx$ **b** $\int \cot^2 2x \, dx$ **c** $\int \sin x \cos x \, dx$

d $\int \frac{\sin x}{\cos^2 x} \, dx$ **e** $\int 4\cos^2 3x \, dx$ **f** $\int (1 + \sin x)^2 \, dx$

g $\int (\sec x - \tan x)^2 \, dx$ **h** $\int \operatorname{cosec} 2x \cot x \, dx$ **i** $\int \cos^4 x \, dx$

6 Evaluate

a $\int_0^{\frac{\pi}{2}} 2\cos^2 x \, dx$ **b** $\int_0^{\frac{\pi}{4}} \cos 2x \sin 2x \, dx$ **c** $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \tan^2 \frac{1}{2}x \, dx$

d $\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \frac{\cos 2x}{\sin^2 2x} \, dx$ **e** $\int_0^{\frac{\pi}{4}} (1 - 2\sin x)^2 \, dx$ **f** $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sec^2 x \operatorname{cosec}^2 x \, dx$

7 **a** Use the identities for $\sin(A + B)$ and $\sin(A - B)$ to show that

$$\sin A \cos B \equiv \tfrac{1}{2}[\sin(A + B) + \sin(A - B)].$$

b Find $\int \sin 3x \cos x \, dx$.

8 Integrate with respect to x

a $2\sin 5x \sin x$ **b** $\cos 2x \cos x$ **c** $4\sin x \cos 4x$ **d** $\cos(x + \frac{\pi}{6}) \sin x$