11.3) Using trigonometric identities

Worked example	Your turn
Find: $$\int \sin^2 x \; dx$$	Find: $$\int \cos^2 x \; dx$$ $$\frac{1}{2}x + \frac{1}{4}\sin 2x + c$$

Worked example	Your turn
Find: $$\int \cot^2 x \ dx$$	Find: $$\int \tan^2 x \ dx$$ $$\color{red}{\tan x - x + c}$$

Worked example	Your turn
Find: $$\int (\sec x - \tan x)^2 \, dx$$	Find: $$\int (\sec x + \tan x)^2 \, dx$$ $$2\tan x - 2\sec x - x + c$$

Worked example	Your turn
Find: $$\int \sin 5x \cos 5x \ dx$$	Find: $$\int \sin 3x \cos 3x \ dx$$ $$-\frac{1}{12} \cos 6x + c$$
$$\int \sin \frac{x}{4} \cos \frac{x}{4} \ dx$$	

Worked example	Your turn
Find: $$\int (\sin x - \cos x)^2 \, dx$$	Find: $$\int (\sin x + \cos x)^2 \, dx$$ $$\textcolor{red}{x - \frac{1}{2}\cos 2x + c}$$

Worked example	Your turn
Find: $$\int (\cos 2x + 1)^2 \, dx$$	Find: $$\int (\cos 2x - 1)^2 \, dx$$ $$\frac{1}{8} \sin 4x + \frac{3}{2} x - \sin 2x + c$$

Worked example	Your turn
Find: $$\int \frac{(1 + \sin x)^2}{\cos^2 x}\, dx$$	Find: $$\int \frac{(1 + \cos x)^2}{\sin^2 x}\, dx$$ $$-2\cot x - x - 2\,cosec\,x + c$$

Worked example	Your turn
Find: $$\int \frac{\cos 2x}{\sin^2 x}\, dx$$	Find: $$\int \frac{\cos 2x}{\cos^2 x}\, dx$$ $$2x - \tan x + c$$

Worked example	Your turn
Show that: $$\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \cos^2 x \ dx = \frac{\pi}{24} + \frac{2-\sqrt{3}}{8}$$	Show that: $$\int_{\frac{\pi}{12}}^{\frac{\pi}{8}} \sin^2 x \ dx = \frac{\pi}{48} + \frac{1-\sqrt{2}}{8}$$ $$\frac{\pi}{12}$$

Worked example	Your turn
Find: $$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \cos^2 3x \ dx$$	Find: $$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sin^2 3x \ dx$$ $$\frac{\pi}{12}$$

Worked example	Your turn
Find:	Find:
$$\int \sin^4 x \; dx$$	$$\int \cos^4 x \; dx$$
	$$\frac{1}{32} \sin 4x + \frac{1}{4} \sin 2x + \frac{3}{8} x + c$$