INTEGRATING TRIGONOMETRIC FUNCTIONS

WORKSHEET 1

(a) $\displaystyle\int 4\cos(4x)\,dx$

(b) $\displaystyle\int 3\cos(4x)\,dx$

(c) $\displaystyle\int \left(x-\sin 5x\right)dx$

(d) $\displaystyle\int \frac{1}{3}\sin\left(\frac{\pi}{2}-x\right)dx$

(e) $\displaystyle\int -\frac{\sin(2x)}{4}\,dx$

(f) $\displaystyle\int x^4 + 2e^{6x} - \cos\left(\frac{3x}{2}\right)dx$

(g) $\displaystyle\int\left(\sin\frac{x+a}{m} + \cos\frac{x+b}{n}\right)dx$

(h) $\displaystyle\int 1 - 2\sin 3\left(x - \frac{\pi}{3}\right) dx$

(i) $\displaystyle\int \frac{4\sin x}{3\tan x} dx$

SOLUTIONS

(a) $\displaystyle\int 4\cos(4x)\,dx = \frac{4}{4}\sin(4x) + c = \sin(4x) + c$

(b) $\displaystyle\int 3\cos(4x)\,dx = \frac{3}{4}\sin(4x) + c$

(c) $\displaystyle\int (x - \sin 5x)\,dx = x^2 - -\frac{1}{5}\cos 5x + c = x^2 + \frac{1}{5}\cos 5x + c$

(d) $\displaystyle\int \frac{1}{3}\sin\left(\frac{\pi}{2} - x\right)dx = -1 \times \frac{1}{3} \times -\cos\left(\frac{\pi}{2} - x\right) + c = \frac{1}{3}\cos\left(\frac{\pi}{2} - x\right) + c$

(e) $\displaystyle\int -\frac{\sin(2x)}{4}\,dx = --\frac{\cos(2x)}{4 \times 2} + c = \frac{\cos(2x)}{8} + c$

(f) $\displaystyle\int x^4 + 2e^{6x} - \cos\left(\frac{3x}{2}\right)dx = \frac{x^5}{6} + \frac{e^{6x}}{3} - \frac{2}{3}\sin\left(\frac{3x}{2}\right)$

(g) $\displaystyle\int \left(\sin\frac{x+a}{m} + \cos\frac{x+b}{n}\right)dx = -m\cos\frac{x+a}{m} + n\sin\frac{x+b}{n} + c$

(h) $\displaystyle\int 1 - 2\sin 3\left(x - \frac{\pi}{3}\right)dx = \int 1 - 2\sin\left(3x - \frac{3\pi}{3}\right)dx$

$\displaystyle = x - -\frac{2}{3}\cos\left(3x - \frac{3\pi}{3}\right) + c = x + \frac{2}{3}\cos 3\left(x - \frac{\pi}{3}\right) + c$

(i) $\displaystyle\int \left(\frac{4\sin x}{3\tan x}\right)dx = \int \left(\frac{4\sin x}{3\dfrac{\sin x}{\cos x}}\right)dx = \int \left(\frac{4\cos x}{3}\right)dx = \frac{4}{3}\sin x + c$