Date:

Assignment 07

M T W T F S S

Excercise 8.1

Q2 $\int \theta \cos \pi\theta \, d\theta$

$\theta \int \cos \pi\theta - \int \int \cos \pi\theta \times \frac{d}{d\theta}(\theta) \cdot d\theta$

$\theta \times \frac{\sin \pi\theta}{\pi} - \int \frac{\sin \pi\theta}{\pi} \times 1 \, d\theta$

$\frac{\theta}{\pi} \sin \pi\theta - \frac{1}{\pi}\left(\frac{-\cos \pi\theta}{\pi}\right) + C$

$\frac{\theta}{\pi} \sin + \frac{1}{\pi^2} \cos \pi\theta + C$

Q4 $\int x^2 \sin x \, dx$

$x^2 \int \sin x - \int -\cos x \times 2x \, dx$

$x^2 \times -\cos x + 2\int \cos x \; x \; dx$

$-x^2 \cos x + 2\left[x \int \cos x - \int \sin x \times 1 \, dx\right.$

$x^2 \cos x + 2\left[x \sin x - (-\cos x)\right] + C$

$x^2 \cos x + 2x \sin x + 2 \cos x + C$

Q6 $\int_1^e \underset{II}{x^3}\ \underset{I}{\ln x}\ dx$

$$\left|\ln x \int x^3\right|_1^e - \int_1^e \int x^3 \times \cancel{1}/x \ dx$$

$$\left|\ln x \times \frac{x^4}{4}\right|_1^e - \int_1^e \frac{x^4}{4} \times \frac{1}{x} \ dx$$

$$\left|\ln x \times \frac{x^4}{4}\right|_1^e - \frac{1}{4}\int_1^e x^4 \times \frac{1}{x} \ dx$$

$$\left|\ln x \ \frac{x^4}{4} - \frac{1}{4} x^3\right|_1^e$$

$$\left|\frac{x^4}{4}\ln(x)\right|_1^e - \frac{1}{4}\int_1^e x^3 \Big|_1^e = \left|\frac{x^4}{4}\ln x - \frac{1}{16}x^4\right|_1^e$$

$$\left[\frac{e^4}{4}\ln(e) - \frac{1}{16}e^4\right] - \left[\frac{(1)^4}{4}\ln(1) - \frac{1}{16}(1)^3\right]$$

Date:

$$\left[\frac{e^4}{4}(1) - \frac{1}{16}e^4\right] - \left[\frac{1}{4}\times 0 - \frac{1}{16}\right]$$

$$\frac{e^4}{4} - \frac{e^4}{16} + \frac{1}{16}$$

$$= \frac{4e^4 - e^4 + 1}{16}$$

$$= \frac{3e^4 + 1}{16}$$

Q10 $\int (x^2 - 2x + 1)\, e^{2x}\, dx$

$$x^2 - 2x + 1 \int e^{2x} - \int\int e^{2x} \times (2x - 2)\, dx$$

$$\frac{e^{2x}}{2}(x^2 - 2x + 1) - \int \frac{e^{2x}}{\cancel{2}} \times \cancel{2}(x - 1)\, dx$$

$$\frac{e^{2x}}{2}(x^2 - 2x + 1) - \int e^{2x} \cdot x - 1 \quad dx$$

$$\frac{e^{2x}}{2}(x^2 - 2x + 1) - \left[(x-1)\int e^{2x} - \int\int e^{2x} \times 1\right.$$

$$\frac{e^{2x}}{2}(x^2 - 2x + 1) - x + 1 \times \frac{e^{2x}}{2} - \int \frac{e^{2x}}{2}\, dx$$