

$$d) \int (\underline{\cos^2 \theta} + \sin^3 \theta) d\theta$$

$$\int \cos^2 \theta d\theta + \int \sin^2 \theta \sin \theta d\theta$$

$$+ \int (1 - \cos^2 \theta) \sin \theta d\theta$$

$$\int \cos^2 \theta d\theta + \int \sin \theta d\theta + \int \cos^2 \theta \sin \theta d\theta$$

$$2 \cos^2 \theta - 1 = \cos 2\theta$$

$$\cos^2 \theta = \frac{\cos 2\theta + 1}{2}$$

$$\frac{1}{2} \int (\cos 2\theta + 1) d\theta + (-\cos \theta) + \frac{\cos^3 \theta}{3} + C$$

$$\frac{1}{4} \int \cos 2\theta d\theta + \frac{1}{2} \int d\theta$$

$$= \frac{1}{4} \sin 2\theta + \frac{1}{2} \theta - \cos \theta + \frac{\cos^3 \theta}{3} + C$$

$$g) \int \underbrace{16x} \cdot \underbrace{\tan^{-1}(4x)} dx$$

$$u = \tan^{-1}(4x) \quad du = 4 dx$$

$$du = \frac{4}{1+16x^2}$$

$$v = 8x^2$$

$$= 8x^2 \tan^{-1} 4x - \int \frac{32x^2}{1+16x^2} dx$$

$$\begin{array}{r}
 16x^2+1 \overline{) 32x^2+0} \\
 \underline{32x^2+2} \\
 -2
 \end{array}$$

$$- \int \left(2 + \frac{-2}{16x^2+1} \right) dx$$

$$- \int 2 dx + \frac{2}{4} \int \frac{4}{1+(4x)^2}$$

$$= 8x^2 \tan^{-1} 4x - 2x + \frac{1}{2} \tan^{-1}(4x)$$

Midterm #2

May 15

Attachments

Bonus Soln - Fox Population.doc

Worksheet Solns - Applications of Sinusoidal Relations.doc