Godalming College

Pure 46 –Integration By Parts

Consolidation of this week's topic.

Please complete all questions.

1) Find:

a) $\int xe^x dx$ b) $\int 4x \sin x \ dx$ c) $\int \frac{x}{e^{3x}} \ dx$ **[6]**

2) Using integration by parts twice, show that:

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

[5]

3) Find:

b) $\int \ln 2x \ dx$ b)$\int 3x \ln x \ dx$ c) $\int (\ln x)^2 \ dx$ **[6]**

4) Evaluate:

a) $\int_{-1}^{0}(x+2)e^x \ dx$ b) $\int_0^3 \ln(2x+3) \ dx$ c) $\int_0^{\frac{\pi}{4}} e^{3x} \sin 2x \ dx$ **[9]**

5) Use integration by parts to find the exact value of $\int_1^3 x^2 \ln x \ \ \mathrm{d}x$. **[6]**

6) (*a*) Use integration by parts to find

$\int x \cos 2x \ \ \mathrm{d}x$. **[4]**

(*b*) Prove that the answer to part (*a*) may be expressed as $\frac{1}{2}\sin x\,(2x\cos x - \sin x) + C$, where C is an arbitrary constant.

[3]

Total: 39 Marks