

Pure 16 –Integration By Parts

Section 1 – Please complete the Mock Targets.

Section 2 – Consolidation of this week’s topic.

Please complete all questions.

1) Find:

a) $\int x e^x dx$ 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 $\int_1^3 x^2 \ln x dx$. [6]

6) (a) Use integration by parts to find

$$\int x \cos 2x dx.$$

[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