Worksheet 3

Integration by Parts

THE BASICS

1. $\int x\cos(x)\,dx$

2. $\int xe^x\,dx$

REPEATED INTEGRATION BY PARTS

3. $\int x^2\sin(x)\,dx$

(seeing a pattern here? Integration by Parts **kills polynomials**!)

4. $\int (3x^3 + 2x^2 + 1)e^x \, dx$

THE HIDDEN FUNCTION TRICK

Hey, f(x) = 1 is a function too! He's just shy.

5. $\int \ln(x) \, dx$

6. $\int \arctan(x) \, dx$

Reappearing Integrals

Sometimes when using IBPs, you get back to where you started. Hopefully you can use algebra to solve this.

7. $\int x^{-1}\ln(x)\,dx$

(Yes, you can solve this using $u = \ln(x)$, but let's ignore this for illustration purposes)

8. $\int \sin(2x)e^{x}\,dx$

IBP w/ Boundary Values

9. $\int_0^1 x^2 e^{x}\,dx$