

Handout 2(b): Integration by Parts

Find an equation for each of the anti-derivatives (or indefinite integrals) given in the table below. In each case, identify u and dv and rewrite the indefinite integral in terms of v and du to make the integral easier to compute.

<i>Anti-derivative (Indefinite integral)</i>	<i>Work and equation for Anti-derivative</i>
$\int x \cdot \cos(x) \cdot dx$	
$\int x \cdot e^{-x} \cdot dx$	

Answers: (a) $x \cdot \sin(x) + \cos(x) + C$. (b) $-x \cdot e^{-x} - e^{-x} + C$.
 (c) $x^2 \cdot e^x - 2x \cdot e^x + 2e^x + C$. (d) $0.5 \cdot e^x \cdot [\sin(x) + \cos(x)] + C$. (e) $x \cdot \ln(x) - x + C$.

Anti-derivative (Indefinite integral)	Work and equation for Anti-derivative
$\int x^2 \cdot e^x \cdot dx$	
$\int e^x \cdot \cos(x) \cdot dx$	
$\int \ln(x) \cdot dx$	

Answers: (a) $x \cdot \sin(x) + \cos(x) + C$. (b) $-x \cdot e^{-x} - e^{-x} + C$.
(c) $x^2 \cdot e^x - 2x \cdot e^x + 2e^x + C$. (d) $0.5 \cdot e^x \cdot [\sin(x) + \cos(x)] + C$. (e) $x \cdot \ln(x) - x + C$.