

Lesson 6.7: Integration by Parts

Integration by parts is a method of integration used mainly for _____ of algebraic and transcendental functions (such as $\int xe^x dx$) or products of two transcendental functions (such as $\int e^x \sin(x) dx$).

Development of the formula for integration by parts:

If u and v are both functions of x , then $\frac{d}{dx}(uv) =$

Formula for Integration by Parts:

Strategy for Integration by Parts:

- Let u be the part whose derivative is “simpler” (or at least no more complicated) than u itself.
- Let dv be the more complicated part (or the part which can easily be integrated).
- Also, remember that typically have only two choices, if one doesn't work try the other.

Examples:

1. $\int xe^x dx$

Let $u =$

Let $du =$

Let $dv =$

Let $v =$

$$\int xe^x dx =$$

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

Let $u =$

Let $du =$

Let $dv =$

Let $v =$

$$\int x \sin(3x) dx =$$

3. $\int \arcsin(x) dx$

Let $u =$

Let $du =$

Let $dv =$

Let $v =$

$$\int \arcsin(x) dx =$$

4. $\int x^2 \sin(2x) dx$

5. $\int_1^e x^2 \ln(x) dx$

6. Complete the square to find $\int \frac{1}{x^2+4x+8} dx$.