Integration By Parts

SUBJECT : MATHEMATICS
CHAPTER NUMBER:7
CHAPTER NAME :INTEGRALS

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Rule of By Parts (Product Rule)

let u and v be two differentiate functions of a single variable x, then the integral of the product of these two functions denoted as $\int u.v\,dx$ and defined as

$$\int u.vdx = u\int vdx = \int \left(\frac{d}{dx}(u)\int vdx\right)dx.$$

If in the product two functions are of different types, then take that function as first function (i.e u) which comes first in the word $ILATE$, where,

I: Inverse trigonometric function

L: Logarithmic function

A: Algebraic function

T : Trigonometric function

E: Exponential function

Example

Evaluate the Integral

$$\int x \sin x \, dx$$

Example

Evaluate the Integral

$$\int logx\ dx$$

Example

Evaluate the Integral

$$\int e^x \cos x \ dx$$

Note:- Above integral can also be determined by taking $cos\ x$ as the first function and e^x the second function.

Example

Evaluate the Integrals

$(a) \int e^{ax} \cos bx \ dx$

$(b) \int e^{ax} \sin bx \ dx$

Assignments

1. Evaluate the Integrals

$(a) \int x^2 \sin x \ dx$

$(b) \int \sin \sqrt{x}\, dx$

$(c) \int (logx)^2 dx$

$(d) \int cosec^3 x \, dx$

$(e) \int x \cot^{-1} x \ dx$

$(f) \int x^3 \log(2x)\, dx$

2. Answer the questions from Qno. 1 to 15 Exercise 7.6 from NCERT book.

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