

Integration by Parts

Mathematics

The product rule run backwards, with the rule for choosing u .

Choose u to become simpler when differentiated.

1

Split the integrand

Write it as $u \, dv$. One factor to differentiate, one to integrate.

2

Choose u by LIATE

Log, Inverse trig, Algebraic, Trig, Exponential — earlier wins.

3

Find du and v

Differentiate u , integrate dv . Leave the constant of integration out here.

4

Apply the formula

Integral of $u \, dv = uv - \text{integral of } v \, du$. The new one should be easier.

5

Repeat, or solve for I

Some integrals return to themselves — rearrange for I rather than looping.

Worked: with $u = x$, the integral of $x e^x \, dx$ is $x e^x - \text{the integral of } e^x \, dx$, giving $e^x(x - 1) + C$.