Suppose there are **two differentiable functions**:

$$u = u(x) \quad \text{and} \quad v = v(x).$$

Find the differential of the product of these functions:

$$d(uv) = du \cdot v + u \cdot dv.$$

Integrating, we get the **integration formula by parts**:

3. Find the integral:

$$I = \int e^x \cos x \, dx$$

Answer:

$$I = \frac{1}{2} e^x (\sin x + \cos x) + C$$