Integration by Parts is a technique used for product-form integrands when u –Substitution fails.

Integration by Parts: $\int udv = uv - \int vdu$
Proof of formula:

The most difficult part is picking your "u".

I-inverse trigonometric
L-logarithmic
A-algebraic (i.e. power functions)
T-trigonometric
E-exponential

The function that is highest is the acrostic will be the best choice for "u"

Integrate each:
Example One: $\int xcosx\ dx$

Example Two: $\int xe^x\ dx$

I-inverse trigonometric
L-logarithmic
A-algebraic
T-trigonometric
E-exponential

Example Three: $\int_1^3 lnx\ dx$

Example Four: $\int x^4 cosx\ dx$

Example Five: $\int e^x cosx\ dx$

Example Six: $\int \frac{\ln(lnx)}{x} dx$