

Before doing problems, let's do a little recap on **Integration by Parts**.

Recall the product rule : $(uv)' = u'v + v'u \Rightarrow \int v'u = uv - \int u'v$.

My secret way of memorizing the formula:

Integrate the first one while keeping the second one, then subtract the integral of the derivative of the first one and the antiderivative of the second one.

Warm Up Questions:

1. $\int x \ln x =$

2. $\int e^x \cos x =$

Slightly more complicated :)

3. $\int 2x \arctan x =$

4. $\int x \sin x \cos x =$

5. $\int \left(\frac{\ln x}{x}\right)^2 =$

Ultimate challenges :D

6. $\int \sin 3x \cos 5x =$

7. $\int \frac{x^2}{\sqrt{1-x^2}} =$