

Math 1432

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Office Hours:

Mondays 1-2pm,
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(also available by appointment)

Class webpage:

<http://www.math.uh.edu/~bekki/Math1432.html>

The integration by parts formula is:

$$\int u dv = uv - \int v du$$

We use it to “undo” the product rule.

1. **Reduction** to integrate

$$x^n \sin(ax), x^n \cos(ax), x^n e^{ax},$$

$$\text{polynomial} \cdot \sin(ax), \text{polynomial} \cdot \cos(ax), \text{polynomial} \cdot e^{ax}$$

2. **Cycling** to integrate

$$\cos(ax)\sin(bx), \cos(ax)e^{bx}, \sin(ax)e^{bx}$$

3. **Change of Form** to integrate

$$\ln(x)f(x), \arctan(x)f(x), \arcsin(x)f(x)$$

(where $f(x)$ has a simple antiderivative)

How do you know what to pick for u and for dv ?

“Shortcut”

ILATE

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1. $\int x \sin x dx$

2. $\int x^2 \cos x dx$

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

4. $\int \sec^3 x dx$

5. $\int x^2 \ln x dx$

6. $\int \ln x dx$

$$7. \int \arctan x dx$$

$$8. \int x^3 e^{-x^2} dx$$

Integration by parts with definite integrals.

$$\int_a^b u \, dv = (uv) \Big|_a^b - \int_a^b v \, du$$

9. $\int_0^1 x e^x \, dx$

Popper09

1. $\int x \ln x^2 dx =$