Math 1B
Disc. #1

Integration by parts

Jan 27
2020

1. Rederive I.B.P. from the product rule (like in lecture)

2. (a) $\int x \sin(x)\, dx$ (b) $\int x \cos(x)\, dx$ (c) $\int x^2 \sin(x)\, dx$

(d*) $\int x^n \sin(x)\, dx$ and $\int x^n \cos(x)\, dx$ (can start by making a table)

3. $\int x^n e^x\, dx$ (start with $n=0,1,2,\ldots$)

4. $\int x^n \ln(x)\, dx$ (same ↗)

5. $\int \tan^{-1}(x)\, dx$ (Hint: $\frac{d}{dx}\tan^{-1}(x) = ?$)

6. $\int \frac{1}{(1+x^2)^3}\, dx$ (Hint: in lecture, got $\int \frac{1}{(1+x^2)^2}\, dx$ in terms of $\int \frac{1}{1+x^2}\, dx$)

7. $\int e^x \sin(x)\, dx$

8. $\int \sin(x)^n\, dx$ (start with $n=0,1,2,\ldots$)

(One formulation: $= -\frac{1}{n}\cos(x)\sin(x)^{n-1} + \frac{n-1}{n}\int \sin(x)^{n-2}\, dx$)