

MATH 231 U1, Spring 2009
Problem Session 1, Sections 6.1, 6.2
Wednesday, January 28th, 2009

1. Do the following integral: $\int \frac{(\arctan x)e^{\arctan x}}{1+x^2} dx$

2. Rank the following functions in terms of the best choice for u , explain and be prepared to defend your rankings.

1. x^2
2. $\sin x$
3. e^x
4. $\ln x$
5. $\tan^{-1} x$.

Now rank them by best choices for dv .

3. Find $\int \arctan(x) dx$

4. Find $\int \cos \sqrt[3]{x} dx$.

5. "Advanced" Integration by Parts:

If $f(x)$ and $g(x)$ are two functions for which $f^{(n)}(a) = g^{(n)}(a) = 0$ and $f^{(n)}(b) = g^{(n)}(b) = 0$ for all $n \geq 0$, show that,

$$\int_a^b f''(x)g(x) dx = \int_a^b f(x)g''(x) dx$$

Further show that for $n \geq 1$ an integer,

$$\int_a^b f^{(n)}(x)g(x) dx = (-1)^n \int_a^b f(x)g^{(n)}(x) dx$$

6. Do #62 from Section 6.2

Homework (due 1/30): Read 6.3 and turn in your answers from problems 1, 3 and 4 on this worksheet (write them up in YOUR OWN WORDS) plus Section 6.3 #13 and 14.