

§ 6.8 L'HOSPITAL'S RULE

47. $\lim_{x \rightarrow \infty} x^3 e^{-x^2}$

59. $\lim_{x \rightarrow 0} (1 - 2x)^{1/x}$

60. $\lim_{x \rightarrow \infty} \left(1 + \frac{a}{x}\right)^{bx}$

§ 7.1 INTEGRATION BY PARTS

I FORGOT TO DISCUSS INTEGRATION BY PARTS FOR DEFINITE INTEGRALS

$$\int_a^b u dx = uv \Big|_a^b - \int_a^b v du$$

(PLEASE EXPLAIN)

I GAVE STUDENTS THE FOLLOWING "RULE OF THUMB":

IN ORDER, TRY SETTING $u =$

LOGARITHMIC FUNCTION
INVERSE FUNCTION
ALGEBRAIC EXPRESSIONS
TRIG. FUNCTIONS
EXPONENTIAL FUNCTIONS

ex. $\int_0^2 x \sinh x dx$

ex. $\int_0^1 x^2 e^x dx$

§ 7.2 TRIG INTEGRALS

I COVERED ONLY

$$\int \sin^m x \cos^n x dx \dots$$

→ IF m ODD: $\rightarrow \int (\text{ALL } \cos) \sin x dx$
 $\sin^2 x = 1 - \cos^2 x$

→ IF n ODD: $\rightarrow \int (\text{ALL } \sin) \cos x dx$
 $\cos^2 x = 1 - \sin^2 x$

→ IF m, n BOTH EVEN: LESS SMOOTH FORWARD

TRIG ID: $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$
 $\cos^2 x = \frac{1}{2}(1 + \cos 2x)$

ex. $\int \sin^9 x \cos^5 x dx$

ex. $\int \sin^2 x dx$

ex. $\int \sin^4 x dx$

ex. $\int \sin^2 x \cos^2 x dx (= \int \sin^2 x (1 - \sin^2 x) dx = \int \sin^2 x - \sin^4 x dx \checkmark)$

IF TIME PERMITS, MOVE ON TO $\int \tan^m x \sec^n x dx$:

ex. $\int \tan^2 x \sec^4 x dx$

ex. $\int \tan^5 x \sec^7 x dx$