MATH 107-153 Recitation 10

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www.math.unl.edu/~jnir2/107-153.html

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1: Integrate each of the following without using an integration table.

$$\text{(a)} \int \frac{1}{\sqrt{1-u^2}} \, du \quad \text{(b)} \int \frac{1}{1-u^2} \, du \quad \text{(c)} \int \frac{u}{\sqrt{1-u^2}} \, du \quad \text{(d)} \int \frac{u}{1-u^2} \, du.$$

Simplify your answer as much as possible.

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p. 378 #7: Find
$$\int_0^1 \ln x \ dx$$
or explain why it does not converge.

p.378 #49: The gamma funciton is defined for all $x > 0$ by the rule

$$\Gamma(x) = \int_0^\infty t^{x-1}e^{-t} \ dt.$$

(a) Find $\Gamma(1)$ and $\Gamma(2)$.

(b) Integrate by parts with respect to t to show that, for positive n,

$$\Gamma(n+1) = n\Gamma(n).$$

(c) Find a simple expression for $\Gamma(n)$ for positive integers n.