HOMEWORK 3, DUE MARCH 12, 2019

ANALYSIS II

(1) Suppose ϕ is a 3-cells in $\mathbf{R}^4$ defined by $\phi(u_1, u_2, u_3) = (u_1 + u_2, u_1 + u_3, u_2u_3, u_1^2)$, Suppose $\omega = dy_2 \wedge dy_3 \wedge dy_4 - dy_1 \wedge dy_3 \wedge dy_4 - 2y_2 dy_1 \wedge dy_2 \wedge dy_3$. Evaluate $\int_\phi \omega$.

(2) A $k-$cells in $\mathbf{R}^n$ ϕ is degenerate if $\phi(u_1, \cdots, u_k)$ is independent of u_i for some i. Prove that if ω a basic k-form, i.e $\omega = dy_I$ where $I = (i_1, \cdots, i_k)$ with $1 \leq i_1 \neq i_2 \neq \cdots \neq i_k \leq n$ and ϕ a degenerate k-cells then $\int_\phi \omega = 0$.