

Assignment 6

Coverage: 15.8 in Text.

Exercises: 15.8 no 5, 7, 9, 13, 15, 19, 20, 25.

Additional Exercises: 12, 14, 19, 23.

Submit 15.8 no. 7, 15, 20; Additional Ex. no. 12, 14, 23 by Oct 19.

Supplementary Problems

1. In the proof of Theorem 1 in Lecture 11, we only consider the case $R_j \in \mathcal{A}$, that is, $\partial f_1 / \partial u \neq 0$ in R_j and leave out the case $\partial f_1 / \partial v \neq 0$ on R_j . Provide a proof in this case. Suggestion: Switch the variables u and v .
2. Find the volume of the ball in \mathbb{R}^4 , that is, $\{(x, y, z, w) : x^2 + y^2 + z^2 + w^2 \leq R^2\}$. Suggestion: Apply the change of variables formula after introducing generalized polar coordinates $w = \rho \cos \psi$, $z = \rho \sin \psi \cos \varphi$, $x = \rho \sin \psi \sin \varphi \cos \theta$, $y = \rho \sin \psi \sin \varphi \sin \theta$ or use cross section method.