

Math 242 - Homework 11

Due Thursday, November 13

Exercises from the Book

- Chapter 3.2# 3, 5, 9, 11
- Chapter 3.3# 1, 3, 4, 5
- See Page 191 for solutions to odd problems.

Additional Exercises

1. Use the formula $V = \iiint_E 1 \, dV$ to compute the volume of the region

$$E = \{(x, y, z) : -1 \leq y \leq 1, y^2 \leq x \leq 1, 0 \leq z \leq x\}.$$

2. The **average value** of a function $f(x, y, z)$ over a solid region S is:

$$f_{\text{average}} = \frac{1}{\text{Volume}(S)} \iiint_S f(x, y, z) \, dV.$$

Find the average value of the function $f(x, y, z) = 6xy$ where S is the region

$$0 \leq x \leq 3, 0 \leq y \leq 2, 0 \leq z \leq 1.$$

3. Use polar coordinates to find $\iint_D e^{-x^2-y^2} \, dA$ where D is the unit disk $D = \{(x, y) : x^2 + y^2 \leq 1\}$.