

Warm-up Problems - February 22, 2006

Solutions

1. Find the average value of $f(x) = x^2$ over the interval $[1, 3]$. (What is the formula for average value?) **Solution:**

$$f_{\text{ave}} = \frac{1}{3-1} \int_1^3 x^2 dx = \frac{1}{2} \left(\frac{26}{3} \right) = \frac{13}{3}$$

Lecture Problems

2. Set up the integrals and integrate both ways (x first y second, then do y first and then x).

(a) $R = \{(x, y) : 1 \leq x \leq 4, -1 \leq y \leq 0\}$

$$\iint_R 3x + y dA$$

Solution: 21

(b) $R = \{(x, y) : -1 \leq x \leq 4, -2 \leq y \leq 1\}$

$$\iint_R 3x^2 y^2 dA$$

Solution: 195

3. Find the average value of the functions over the rectangles in Problem 2.

Solution:

(a) $f_{\text{ave}} = \frac{21}{(3)(1)} = 7$

(b) $f_{\text{ave}} = \frac{195}{(5)(3)} = 13$