

1. (a) Estimate the volume of the solid that lies below the surface  $z = xy$  and above the rectangle

$$R = \{(x, y) \mid 0 \leq x \leq 6, 0 \leq y \leq 4\}$$

Use a Riemann sum with  $m = 3$ ,  $n = 2$ , and take the sample point to be the upper right corner of each square.

- (b) Use the Midpoint Rule to estimate the volume of the solid in part (a).
5. A table of values is given for a function  $f(x, y)$  defined on  $R = [1, 3] \times [0, 4]$ .
- (a) Estimate  $\iint_R f(x, y) dA$  using the Midpoint Rule with  $m = n = 2$ .
- (b) Estimate the double integral with  $m = n = 4$  by choosing the sample points to be the points farthest from the origin.

$x \backslash y$	0	1	2	3	4
1.0	2	0	-3	-6	-5
1.5	3	1	-4	-8	-6
2.0	4	3	0	-5	-8
2.5	5	5	3	-1	-4
3.0	7	8	6	3	0

11–13 Evaluate the double integral by first identifying it as the volume of a solid.

11.  $\iint_R 3 dA$ ,  $R = \{(x, y) \mid -2 \leq x \leq 2, 1 \leq y \leq 6\}$

14. The integral  $\iint_R \sqrt{9 - y^2} dA$ , where  $R = [0, 4] \times [0, 2]$ , represents the volume of a solid. Sketch the solid.