

DOUBLE INTEGRALS - PRACTICE PROBLEMS

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1. Use the Midpoint Rule to estimate the volume under $f(x, y) = x^2 + y$ and above the rectangle given by $-1 \leq x \leq 3, 0 \leq y \leq 4$ in the xy -plane. Use 4 subdivisions in the x direction and 2 subdivisions in the y direction.

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

$$R = [0, 6] \times [0, 4].$$

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).
3. If $R = [0, 4] \times [-1, 2]$, use a Riemann sum with $m = 2, n = 3$ to estimate the value of $\iint_R (1 - xy^2) dA$. Take the sample points to be (a) the lower right corners and (b) the upper left corners of the rectangles.
4. (a) Use a Riemann sum with $m = n = 2$ to estimate the value of $\iint_R xe^{-xy} dA$, where $R = [0, 2] \times [0, 1]$. Take the sample points to be upper right corners.
(b) Use the Midpoint Rule to estimate the integral in part (a).
5. (a) Estimate the volume of the solid that lies below the surface $z = 1 + x^2 + 3y$ and above the rectangle $R = [1, 2] \times [0, 3]$. Use a Riemann sum with $m = n = 2$ and choose the sample points to be lower left corners. (b) Use the Midpoint Rule to estimate the volume in part (a).