Double Integrals and Volume

1. Approximate the integral $\int_R \int f(x,y)dA$ by dividing the rectangle R with vertices (0, 0), (4, 0), (4, 2), and (0, 2) into eight equal squares and finding the sum $\sum_{i=1}^{8} f(x_i, y_i)\Delta A_i$ where (x_i, y_i) is the center of the ith square. Evaluate the iterated integral and compare it with the approximation (Similar to p.1000 #1-4)

$$\int_0^4 \int_0^2 (2x + 4y)\, dy\, dx$$

2. Sketch the region R and evaluate the iterated integral (Similar to p.1000 #7-12)

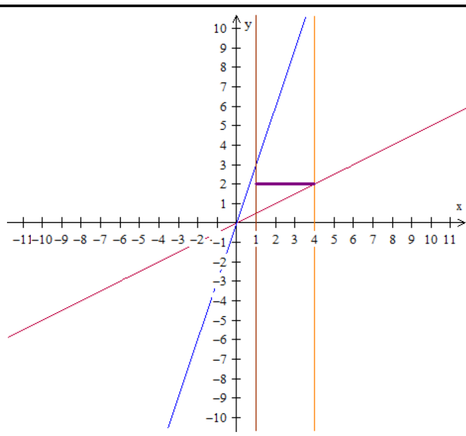
$$\int_0^3 \int_0^1 (3 + x + 2y)\, dy\, dx$$

3. Set up integrals for both orders of integration, and use the more convenient order to evaluate the integral over the region R. (Similar to p.1001 #13-20)

$$\int_R \int \left(\frac{2y}{x^2 + y^2} \right) dA$$

$$R: \text{trapezoid bounded by}$$

$$y = \frac{1}{2}x,\ y = 3x,\ x = 1,\ x = 4$$



4. Use a double integral to find the volume of the indicated solid (Similar to p.1001 #21-29)

$$z = \frac{y}{4}$$

$$0 \le x \le 8$$

$$0 \le y \le 4$$

5. Set up and evaluate a double integral to find the volume of the solid bounded by the graphs of the equations.
(Similar to p.1001 #33-40)

$$z = x^2 y, z = 0, y = x, x = 2, \text{first octant}$$

6. Set up and evaluate a double integral to find the volume of the solid bounded by the graphs of the equations.
(Similar to p.1001 #33-40)

$$z = x^4, z = 0, x = 0, x = 3, y = 0, y = 2$$

7. Set up and evaluate a double integral to find the volume of the solid bounded by the graphs of the equations.
(Similar to p.1001 #33-40)

$$x^2 + z^2 = 4, y^2 + z^2 = 4, \text{first octant}$$

8. Sketch the region of integration. Then evaluate the iterated integral, switching the order of integration if necessary
(Similar to p.1002 #53-58)

$$\int_0^6 \int_{y/3}^2 (e^{x^2})\, dx\, dy$$