(1) Do problems 5, 7, 9, 15, 19, 25 from Section 13.1 of Smith and Minton.

(2) Suppose $f(x, y) = x^2 + y^2$. Let $R = [0, 2] \times [0, 3]$. Let the partition $P$ be the six unit squares. Let each $(x^*_i, y^*_i)$ be the upper right hand corner of the rectangle $R_i$. Use this information to estimate

$$\int \int_R f(x, y) \, dA.$$ 

(3) Evaluate the following integrals:

(i) $\int_0^1 \int_0^{y^{1/3}} \frac{1}{\sqrt{1 + x^2}} \, dx \, dy$

(ii) $\int_0^x \int_{x^{2/3}}^4 x \cos(y^4) \, dy \, dx$

(iii) $\int_0^4 \int_{\sqrt{y}}^2 \frac{ye^x}{x^3} \, dx \, dy$.

(4) Sketch the solid whose volume is given by the double integral

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