1) If $f(x, y) = 2x + 3x^2 y$ find the following:

   a) $\int_0^3 f(x, y)\ dx$

   b) $\int_0^4 f(x, y)\ dy$

2) Calculate the following iterated integrals:

   a) $\int_1^3 \int_0^1 (1 + 4xy)\ dx\, dy$

   b) $\int_0^2 \int_0^{\pi/2} x \sin y\ dy\, dx$

   c) $\int_0^1 \int_1^2 \frac{xe^x}{y}\ dy\, dx$

   d) $\int_0^{\ln 2} \int_0^{\ln 5} e^{2x-y}\ dx\, dy$

3) Calculate the following double integrals:

   a) $\iint_R (6x^2 y^3 - 5y^4)\, dA, \quad R = \{(x, y) \mid 0 \le x \le 3,\ 0 \le y \le 1\}$

   b) $\iint_R \frac{xy^2}{x^2 + 1} dA, \quad R = \{(x, y) \mid 0 \le x \le 1,\ -3 \le y \le 3\}$

   c) $\iint_R \frac{x}{1 + xy} dA, \quad R = [0,1] \times [0,1]$

4) Sketch the solid whose volume is given by the iterated integral $\int_0^1 \int_0^1 (2 - x^2 - y^2)\, dy\, dx$.

5) Find the volume of the solid that lies under the hyperbolic paraboloid $z = 4 + x^2 - y^2$ and above the square $R = [-1,1] \times [0,2]$.

6) Find the volume of the solid bounded by the elliptic paraboloid $z = 1 + (x-1)^2 + 4y^2$, the planes $x = 3$ and $y = 2$, and the coordinate planes.