Homework Section 15.2

1. Evaluate the iterated integral.

   a) $\int_1^2 \int_0^1 (1+4x^3y)\,dx\,dy$

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

   c) $\int_1^6 \int_1^2 \left(\frac{x}{y}+e^x\right)dy\,dx$

   d) $\int_1^2 \int_0^1 (2x+y)^{-4}\,dx\,dy$

2. Evaluate the double integral.

   a) $\iint_R \sin(2x+y)\,dA,\quad R=\{(x,y)\mid 0\le x\le \frac{\pi}{2},\ 0\le y\le \frac{\pi}{2}\}$

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

   c) $\iint_R xye^{xy^2}\,dA,\quad R=[0,2]\times[0,3]$ (**Hint**: integrate w.r.t. *y* first)

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

4. Find the volume of the solid formed between the paraboloid $z=1-\frac{x^2}{4}-\frac{y^2}{9}$ and the square $R=[-1,1]\times[-1,1]$ that lies in the *xy*-plane.

5. Find the volume in the first octant of the solid formed between the cylinder $z=4-y^2$ and the plane $x=1$.