KIX 1001: ENGINEERING MATHEMATICS 1
Tutorial 10: Multiple Integrals

1) Evaluate each of the following integrals over the given region D

   a) $\iint_D e^{x/y} \, dA$ $\qquad$ $D = \{(x,y)|1 \le y \le 2, y \le x \le y^3\}$

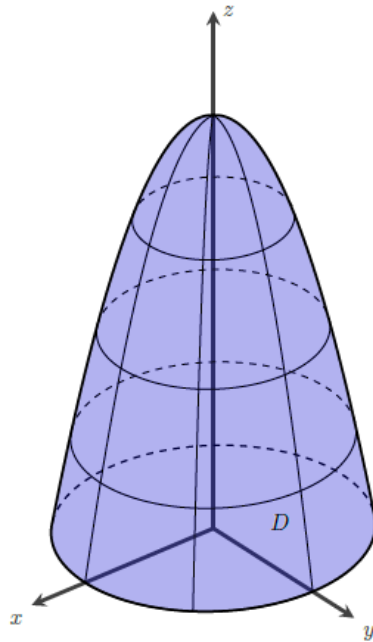   b) $\iint_D 4xy - y^3 \, dA$, D is the region bounded by $y = \sqrt{x}$ and $y = x^3$

2) Evaluate

$$\int_0^8 \int_{\sqrt[3]{y}}^2 \sqrt{x^4 + 1} \, dx \, dy$$

3) Evaluate the following integral

$$\iiint_B 8xyz \, dV, \quad B = [2,3] \times [1,2] \times [0,1]$$

4) Determine the volume of the region that lies behind the plane $x + y + z = 8$ and in front of the region in the yz-plane that is bounded by $z = \frac{3}{2}\sqrt{y}$ and $z = \frac{3}{4}y$

5) Find the volume of the region bounded by the paraboloid z = 4 - 4x² - 4y² and the plane z = 0.

6) Evaluate the following integral

$$\iiint xy^2\cos(xyz)\ dx\ dy\ dz\ ; B = [0,\pi] \times [0,1/2] \times [0,1]$$