Math 253A - Accelerated Calculus III

Homework sheet 9   **Due 03/21/2018**

To read: Section 14.2, 14.3, 14.4 in the book.

Problem 1
Find the volume of the solid that lies under $z = x\sqrt{x^2 + y}$ and above the rectangle given by $0 \le x \le 4$ and $0 \le y \le 9$ in the xy plane.

Problem 2   (§14.2 #8,10) Integrate the function f over the given region Ω:

(a) the function $f(x, y) = x^2 + y^2$ over the triangular region Ω with the vertices $(0, 0)$, $(1, 0)$ and $(0, 1)$.

(b) the function $f(x, y) = e^x \ln(y)$ over the region Ω in the xy-plane that lies between the curves $x = 0$ and $x = \ln(y)$ from $y = 1$ to $y = 2$.

Problem 3   Sketch the region determined by the limits of integration and then give another iterated integral (or sum of iterated integrals) using the opposite order of integration.

(a)
$$\int_0^2 \int_x^{4-x} f(x, y) \, dy \, dx,$$

(b)
$$\int_1^2 \int_{\ln x}^{e^x} f(x, y) \, dy \, dx.$$

Problem 4   Find the volume of the solid enclosed by the surfaces $x^2 + y^2 + z = 4$, $x^2 + 2y^2 - z = 2$, $x = -1$, $x = 1$, $y = -1$, and $y = 1$.