WEDNESDAY 12TH NOVEMBER : DOUBLE INTEGRALS II

Reading: sections 12.3 and 12.4
Homework: see www.courses.fas.harvard.edu/~math21a/

1. ITERATED INTEGRALS

(1) Let R be the rectangle $[0,1] \times [-\frac{\pi}{2}, \frac{\pi}{2}]$. Compute

$$\iint_R x \sin y \, dA$$

(2) Find the volume of the solid which lies under the surface $z = x^2 + 2xy$ and above the rectangle $[0,1] \times [0,2]$ in the xy-plane.

(3) Find the volume of the solid in the first octant bounded by the surface $z = 4 - x^2$ and the plane $y = 3$.

2. Double integrals over general regions

(1) Let T be the triangle with vertices $(0,0)$, $(1,0)$ and $(1,1)$. Compute

$$\iint_T x^2 y \, dA$$

(2) Let R be the region in the first quadrant bounded by the curves $x = 1$ and $y = x^3$. Compute

$$\iint_R x^2 + y^2 \, dA$$

(3) Let R be the region in the xy-plane bounded by the curves $y = x^2$ and $x = y^2$. Compute

$$\iint_R x + y \, dA$$