# HOMEWORK 8

MA1132: ADVANCED CALCULUS, HILARY 2017

(1) Compute the double integral

$$\iint_R \sqrt{y} dA,$$

where $R$ is the region between the curves $y = \sqrt{x}$ and $y = x^2$. (Hint: break the region $R$ into two pieces.)

(2) Find the value of

$$\iint_R (x^2 - y) dA$$

where $R$ is the square with vertices $(-1, 0)$, $(1, 0)$, $(0, 1)$, and $(0, -1)$.

(3) Let $R$ be the region in the $x$-$y$ plane bounded by the lines $y = 1$, $y = 2$, the $y$-axis, and the curve $y = 1/x$. Find the volume lying over $R$ und under the graph of the function $f(x, y) = e^{xy}$.

(4) Use polar coordinates to compute

$$\iint_R xy dA$$

where $R$ is the region lying between the concentric circles of radii 1 and 2 centered at the origin and in the first quadrant (this is one quarter of an annulus).

(5) Compute the value of

$$\int_{-1}^{1} \int_{0}^{\sqrt{1-x^2}} \cos(x^2 + y^2) dy dx$$

by switching to polar coordinates.