

Math 102 Homework-1

Due Date: 14 July 2008 Monday

Either hand in your homework solutions in class or put them in my mail box until 17:00 on Monday.

Q-1) Let $f(x, y) = y^2 \sin\left(\frac{xy^2\pi}{6}\right)$. Evaluate the following integral:

$$\mathbf{I} = \int_{1/2}^1 \int_{1/x}^2 f(x, y) dydx + \int_1^3 \int_1^2 f(x, y) dydx + \int_3^6 \int_1^{6/x} f(x, y) dydx.$$

Q-2) Find the area, in the first quadrant, that is both inside the circle $r = \sqrt{2}$ and the lemniscate $r = \sqrt{4 \cos 2\theta}$.

Q-3) Set up an integral to evaluate the volume of the region common to two right circular cylinders, of radii a and b where $a > b > 0$, intersecting orthogonally along their central axes.

Q-4) Find the volume of the region bounded from above by $x^2 + y^2 + z^2 = 4$, from below by $z = 1$, and from the sides by $x^2 + y^2 - 2y = 0$.

Q-5) Evaluate the integral

$$\int \int_R \sin^2\left(\frac{x+y}{x-y}\right) dA$$

where R is the convex quadrilateral region with vertices at the points $(1, 0)$, $(2, 0)$, $(0, -2)$, $(0, -1)$.

Please send comments and questions to serto@bilkent.edu.tr
