

Calculus 114 – Homework 2

Please take your homework solutions to room SA144, Ali Adalı's office
on **May 7, 2008 Wednesday** before recitation hour.

Ali Adalı will solve the homework problems on the recitation hour that day.

It is highly recommended that you also solve the routine problems from Thomas's Calculus, pages 1047-1049 for Lagrange multipliers method. We will be completing Chapter 15 on Monday, so you should also solve all the problems on that chapter. Do not wait until the final exam week!

Q-1) Find the absolute minimum and maximum of $f(x, y, z) = x^2 + y^2 + z^2$ subject to the conditions $x + y + z = 1$ and $x^2 + y^2 - z^2 = 0$.

Q-2) Find the absolute minimum and maximum of $f(x, y) = x^2 + y^2 + xy$ subject to the condition $x^2 + y^2 \leq 1$.

Q-3) Find the shortest distance between the following two skew lines:
 $x = 1 + 4t, y = 2 + 5t, z = 3 + 6t, t \in \mathbb{R}$, and $x = 7 + 10s, y = 8 + 11s, z = 9 - 12s, s \in \mathbb{R}$.

Q-4) Find the area bounded by the folium of Descartes $x^3 + y^3 - 9xy = 0$. (*You will probably need a software to evaluate the resulting integral. You may do so provided that you explain what you are doing.*)

Q-5) Find the volume inside the cylinder $x^2 - 2x + y^2 = 0$ bounded from above by the surface $x^2 + y^2 + z = 4$ and from below by the xy -plane.

Please forward any comments or questions to sertoz@bilkent.edu.tr