Mathematics 266 – Spring 2000 — Section 201

Second home work — due Friday, Januray 21

Exercise 1. *Find the equation of the plane tangent to a level surface of* $1/x + 1/y + 1/z$ *at* $(2, 1, 1)$.

Exercise 2. *(a) Draw the curve* $t \mapsto (3\cos t - \sin 2t, 3\sin t - \cos 2t)$. *(b) Find the area inside it.*

Exercise 3. *For which values of* n *is the field* $[x, y]/r^n$ *conservative? When it is, find the corresponding potential.*

Exercise 4. *For which values of* n *is the field* $[-y, x]/r^n$ *conservative?*

Exercise 5. *Find the circulation of the field* $[-y, x]/r^2$ *(a) around the unit circle; (b) around the unit square centered at the origin.*

Exercise 6. *Find the flux of the 3D Coulomb field through the sphere of radius* r.

Exercise 7. *Find the flux of the 2D field* $[x, y]/r^2$ *through the unit circle; through the unit square centred at the origin.*

Exercise 8. *Find* $\mathrm{div}(\mathrm{grad}(f(x, y)))$.