## LAST PAGE OF FINAL EXAM

$$D = (f_{xx})(f_{yy}) - (f_{xy})^2$$

$$A(S) = \iint\limits_{D} \sqrt{1 + \left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2} \, dA$$

 $z = \rho \cos \phi, \, x = \rho \sin \phi \cos \theta, \, y = \rho \sin \phi \sin \theta, \, dV = \rho^2 \sin \phi \, d\rho \, d\theta \, d\phi.$