Math 164 - Quiz Seven

Attempt 2 of 4 Problems; use no notes or calculators.

1. State the 2nd Order nonlinear elliptic ODE (or PDE) boundary value problem and the nonlinear functional $J$ whose critical points are solutions to that differential equation.

2. Either write down the integral for $J'(u)(v)$ for the above functional, or very briefly pseudocode the Gradient Newton Galerkin Algorithm for finding critical points of $J$. 
3. Define the spline $S$ in terms of the cubics $S_i$ for fitting data $\{(x_i, a_i)\}_{i=0,...,n}$.

4. Identify carefully the $4n$ unknowns and the $4n$ equations used to solve for the above spline.