1 PART I

Consider the Neo-Classical growth model with endogenous labor supply. The representative consumer has the period utility:
The utility function is:

$$u(c,l) = \frac{c^{1-\sigma}}{1-\sigma} - \chi \frac{l^{1+\eta}}{1+\eta}$$

Labor hours are constrained to be $l \in [0,1]$. Capital depreciates at rate δ every period. The parameters of the model are as follows: $\alpha = \frac{1}{3}$, $z = 1$, $\sigma = 2$, $\eta = 1$, $\delta = 0.05$ and set χ such that l_{ss} = 0.4.

1. Solve the planner's problem numerically using VFI. You must treat all choice variables and states as continuous. You must do it using: a) Direct maximization over a pair of variables(c, l) or (k', l) , b) Direct maximization over a single variable (k') with other variables solved for analytically; and c) Solving the first order conditions.

   The plan for a) so far would be something like:
   The bellman operator as follows:

   (a) First create a grid for l
   (b) Interpolate the value function
   (c) Employ the continuous choice bellman operator for solving for $k' = g(k)$, V, and employing the resource constraint for $c = g_c(k, k', l)$ for every value on the grid of l.
   (d) Now, again interpolate the Value function of all the points I dont observe of the l grid.
   (e) Define a new objective function that after optimizing returns the optimal value of l even if it is not in the grid.
   (f) Repeat until convergence.

2. 2
3. 3
4. 4
5. 5
6. 6
7. 7