Problem 1: Solow-model and golden-rule discussion

Consider the central steady-state equation in $k^\#$ characterizing the Solow-model (as derived in the Lecture Notes):

$$s \cdot f(k^\#_{So}) = (\delta + \mu_N^\#) \cdot k^\#_{So}$$

a) Find a relationship between $c^\#_{So}$ and $k^\#_{So}$.

b) Let $k^\#_{GR}$ denote the golden-rule level of the capital stock per unit of effective labour. Show that $\frac{\partial c^\#_{So}}{\partial s} > 0$ if $k^\#_{So} < k^\#_{GR}$.

c) Consider a permanent increase in the savings rate (starting out from a steady-state constellation characterized by $\frac{\partial c^\#_{So}}{\partial s} > 0$). Find a graphical representation of the time paths of $c^\#_t$ (i.e., consumption per unit of effective labour) and $c_t$ (i.e., per capita consumption) before and after the shock occurs.

d) Consider the Cobb-Douglas function

$$f(k^\#) = (k^\#)^\alpha$$

Let $\alpha = 1/3$ and $s = 0.15$. Show that these values imply $\frac{\partial c^\#_{So}}{\partial s} > 0$. 