EXERCISES
CHAPTER 8: TECHNOLOGY

1) Do problems 1 and 2 in Weil chap 8.

2) **Slowdown in productivity growth**
Consider the following two scenarios:
   i) The rate of technological progress drops permanently.
   ii) The savings rate drops permanently.

a) Analyse graphically, what is the impact of each of these scenarios on economic growth in the next five years (short run)?
b) Over the next five decades (long run)?
Discuss the effects on both growth rates and output levels.

3) **Steady-state output and technological progress**
Suppose that the economy's production function is

$$Y = AK^{\alpha}L^{1-\alpha} = K^{\alpha}(eL)^{1-\alpha}, \text{ with } \alpha = 1/2$$

where A denotes TFP and $e \equiv A^2$. Based on the notation used in class, we have $\gamma = 16\%$, $\delta = 10\%$, $n = 2\%$ and $\hat{e} = 4\%$ per year.

a) Find the steady-state values of
   i) Capital stock per effective worker
   ii) Output per effective worker
   iii) Growth rate of output per effective worker
   iv) Growth rate of output per worker
   v) Growth rate of output
   vi) Output level per worker as given by $y_t^{ss} = e_t y_e^{ss}$.
b) Suppose that the rate of technological progress $\hat{e}$ jumps to 8%. Recompute the answers to a) and discuss your results.
c) Suppose that $\hat{e}$ is still equal to 4% but that worker population growth is now $n = 6\%$. Recompute the answers to a).
d) Compare the welfare of the workers in a), b) and c) in terms of level of income per worker. Discuss.