No Due Date, But Please Do Do It

[Note: Read the whole of Chapter 7 a couple of times before attempting]

1) Assume that production is a function of capital and labor, and that the rate of savings and depreciation are constant, as described in Chapter 7's version of the Solow Model. Further, assume that the production function can be described by the function:

$$Y = K^{\left(\frac{1}{2}\right)} L^{\left(\frac{1}{2}\right)}$$

where K is capital and L is labor.

a. What is the per-worker production function $y=f(k)$? Show your work.

b. Solve for steady-state capital per worker, production per worker, and consumption per worker with $s = 0.4$? (Note: you need to set $\Delta k = 0$, to get an equation in s, δ, and k, and then solve for k).

2) Assume once again that production is given by: $Y = K^{\left(\frac{1}{2}\right)} L^{\left(\frac{1}{2}\right)}$. First, write the production function in per person terms ($y=f(k)$). Next, assume that the per person level of capital in the steady state is 4, the depreciation rate is 5% per year, and population growth is 5% per year. Does this economy have "too much" or "too little" capital? How do you know? [Show your work].

3) Suppose that two countries are exactly alike in every respect (meaning they have the same levels of capital, output, depreciation, etc.) except that the citizens of country A have a higher saving rate than the citizens of country B.

a. Which country will have the higher level of output per worker in the steady state? Illustrate graphically.

b. Which country will have the faster rate of growth of output per worker?

4) Suppose that two countries are exactly alike in every respect (meaning they have the same levels of capital, output, depreciation, etc.) except that population grows at a faster rate in country A than in country B.

a. Which country will have the higher level of output per worker in the steady state? Illustrate graphically.

b. Which country will have the faster rate of growth of output per worker?

5) The initial steady-state level of capital per worker in Macroland is 5. The Golden Rule level of capital per worker in Macroland is 8.

a. What must change in Macroland to achieve the Golden Rule steady state?

b. Why might the Golden Rule steady state be preferred to the initial steady state? (two or three sentences)

c. Why might some current workers in Macroland prefer the initial steady state to the Golden Rule steady state? (two or three sentences)

6) The economy of Alpha can be described by the Solow growth model. The following are some characteristics of the Alpha economy:

savings rate (s)	0.20
depreciation rate (δ)	0.12
steady-state capital per worker (k^*)	4
population growth rate (n)	0.02
steady-state output per worker	20,000

a. What is the steady-state growth rate of output per worker in Alpha?

b. What is the steady-state growth rate of total output in Alpha?

c. What is the level of steady-state consumption per worker in Alpha?

d. What is the steady-state level of investment per worker in Alpha?