Section Questions for Homework 2
Economics 101 - Chapters 8 and 9

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1) Country A and country B both have the production function: $Y = F(K,L) = K^{1/2}L^{1/2.}$ Assume that in both countries capital depreciates at a rate of 10% each year. (Assume no population growth and no technological progress in either country.) Assume further that country A saves a constant 20 percent of its income each year and that country B saves 30 percent.
   a) Compute the "per-worker" form of the production function above.
   b) Using this and the steady-state condition, compute the steady-state level of capital per worker for each country.
   c) Now compute the steady state level of consumption per worker in each country. Since the golden rule is defined as the level of capital that allows the greatest level of consumption in steady state, which of these two countries has a steady state closer to the golden rule steady state? Why does a smaller marginal propensity to consume here result in a higher *steady state level* of consumption (some people might find this surprising)?
   d) Check your conclusion above by computing the golden rule level of capital stock, and the saving rate necessary to achieve it.

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2) China's real per-person GDP growth rate (percent change in output) has been much greater than that in the U.S. in the last decade. For example, China grew about 10% last year, compared to less than 3% for the U.S.
   a) Using the Solow growth model (with no technological progress), is there reason to believe this disparity in growth rates will disappear in time? What about the disparity in income levels per person?
   b) How is your conclusion affected if China has a higher saving rate than the U.S.?
   c) What if the saving rates are the same, but China has a higher population growth rate?

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3) A recent book, "Capital in the Twenty-First Century" by Thomas Piketty, has warned about rising income inequality. The book has so far sold more than 1.5m copies, and last year it won the Financial Times's business book of the year award. The book argues that over time the share of national income going to those who own capital (the rich) rises, while the portion going to labor (everyone else) falls. Discuss whether this can be a problem if all the assumptions of the Solow model were true? In particular, as the economy grows in steady state due to technological progress, will this lead to a greater share of national income being paid to owners of capital? You may assume: production is a constant returns to scale function of capital and labor, with constant depreciation rate δ, constant population growth rate n, and constant technological progress rate g. Assume a constant saving rate, s. Maintain the assumptions of the Neoclassical model: firms are perfectly competitive and profit maximizing (which make Euler's theorem hold).

   If it is easier, you may consider the case of a specific production function $Y = AK^{\alpha}(LE)^{1-\alpha}$.
