

Place your name on the back of this sheet of paper and nowhere else. Staple your answers face up on the front of this sheet of paper. Failure to follow these directions will cost you 10 points. Your assignment will be typed, except graphs can be drawn by hand and mathematical equations can be done by hand. Failure to type it will cost you 10 points. If you use double-sided printing or print on the back of scrap paper, I will give you one additional point.

1) (15 points) Explain the equation to the right. You can treat  $\Delta X/X$  as a single variable after you define it. You do not need to explain  $a_K$  and  $a_N$  but you should give me a number for them and explain why that number makes sense.

$$\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + a_K \frac{\Delta K}{K} + a_N \frac{\Delta N}{N}$$

2) (10 points) Suppose the economy grew at 3%, the population grew at 2%, and the capital grew at 4%. Find the growth rate of technology showing all work.

3) (20 points) Draw the graph for the Solow Growth Model. Illustrate the effects of a decrease in the growth rate of the population. Explain why the curve(s) moved as drawn. What happens to the equilibrium GDP per capita and the capital-labor ratio?

4) (20 points) Draw the graph for the Solow Growth Model. Illustrate the effects of an increase in the saving rate. Explain why the curve(s) moved as drawn. What happens to the equilibrium GDP per capita and the capital-labor ratio?

5) (15 points) Draw the Solow Growth Model diagram. Assume that we start out to the left of the equilibrium capital-labor ratio. Prove that we will go back to the equilibrium.

6) (10 points) Some people have criticized the Solow Growth Model by stating it concludes that all countries should approach the same GDP per capita and the same capital-labor ratio. However, we do not see that occurring. How can the model be used to prove there won't be convergence of GDP per capita across countries? Explain your logic.

7) (10 points) Why is it unlikely that  $k^* = k_G$ ? Explain your logic.