1. Suppose the subsistence level of output per person decreases, due to advances in medical treatment. Use the subsistence (Malthusian) theory of growth to predict the effect of this change on output, population and labor productivity.

The subsistence theory predicts that the steady-state population occurs when the average productivity of workers equals the subsistence level of output per worker. If the subsistence level decreases, the subsistence line will rotate clockwise. At the original population, labor productivity will exceed subsistence, so the population will grow and output will rise. However, as the population grows, diminishing returns to labor set in, so the population reaches a higher steady-state level and output is higher. But growth will stop when labor productivity once again equals (the lower level of) subsistence output.

2. It is well known that output in many Asian countries, such as Singapore and Korea, has grown at extraordinarily high rates over the last few decades. Some economists claim that this growth is due to high growth in inputs – labor and capital – not productivity. If this claim is indeed true, should we expect this growth to continue? Why or why not?

If the sole reason for growth is a growth in inputs (labor and capital), then growth theory predicts that output growth will eventually halt due to diminishing returns. If however, growth is due to technological advances in productivity, then growth can continue, since technology can break the link between growth and diminishing returns.

3. Over the past century in the US, growth in labor productivity and growth in the capital/labor ratio have roughly been equal, about 2.5% annually. Why then do economists claim that technological advance must be an important component of growth in the US? What is a rough estimate of the contribution of technology to the growth in US productivity?

According to the growth accounting formula, if capital per worker grows at a rate of 2.5%, then output per worker would grow at a rate of only 0.83%. Only if technology were improving could output per worker grow at 2.5%. In fact, the growth accounting formula predicts that technology has improved by 1.67%.
4. How might a permanent increase in government spending affect the rate at which an economy grows? Hint: one way to answer this question is to use the spending shares model of the market for borrowing and lending.

According to that model, an increase in government spending will raise real interest rates and crowd out private investment. As investment falls, the growth in the capital stock will fall, thus slowing growth in output.

5. *The Economist* article on growth (see my Oct. 28 e-mail) mentions property rights and legal systems as important for economic growth. Why is this an important lesson for less-developed economies that perhaps have not attained their production possibility frontiers?

In primitive economies, growth originally comes about by people figuring out how to produce efficiently through specialization and the division of labor; i.e. taking advantage of comparative advantage. This increase in efficiently brings about growth by moving production to the production possibility frontier. Well-defined property rights, and effective legal systems to enforce these rights, make it easier to make trades and therefore allows people to specialize.

6. Is economic growth a good thing or a bad thing? Why?

The purpose of this question was just to get you to think and to keep in mind that, while growth has its benefits, it also has its costs (e.g. external costs such as pollution). One reasonable way to think about this is that the marginal benefits of growth decline with more growth, and the marginal costs increase with more growth. Therefore, there might be an optimal rate of growth.