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ECON 202
INTERMEDIATE MACROECONOMICS **28 June 2007**
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Summer School
Exercise I
Some Concepts and the Measurement

1. (Abel and Bernanke, 2005) Here are some macroeconomic data for the country of PotatoeLand for the years 2002 and 2003:

	2002	2003
Output	**12,000 tons of potatoes**	**14,300 tons of potatoes**
Employment	**1,000 workers**	**1,100 workers**
Unemployed	**100 workers**	**50 workers**
Total Labor force	**1,100 workers**	**1,150 workers**
Prices	**2 dollars per ton**	**2.5 dollars per ton**

As the data suggest, PotatoeLand produces only potatoes, and its monetary units is the dollars. Calculate each of the following macroeconomic variables, being sure to give units.
a. Average labor productivity in 2002 and 2003.
b. The growth rate of average labor productivity between 2002 and 2003.
c. The unemployment rate in 2002 and 2003.
d. The inflation rate between 2002 and 2003.

2. (Williamson, 2005) Consider the following data on real GDP per capita in the United States:

Year	Real GDP per capita (1996 Dollars)
1950	**11,205**
1960	**13,339**
1970	**17,718**
1980	**21,904**
1990	**27,100**
1995	**28,747**
1996	**29,520**
1997	**30,519**
1998	**31,478**
1999	**32,238**
2000	**32,748**
2001	**32,375**
2002	**32,713**

a. Calculate the percentage growth rates in real GDP per capita in each of the years 1996 through 2002, from the previous year.
b. Now, instead of calculating the annual percentage growth rates in the years 1996 through 2002 directly, use as an approximation $100x(\ln y_t - \ln y_{t-1})$, where y_t is real per capita GDP in year *t*. How close this approximation does come to the actual growth rates you calculated in part (a)?
c. Repeat parts (a) and (b) for 1950, 1960, 1970, 1980, 1990, and 2000. In this case, how large an error do you make by approximating the growth rate by the change in natural log?

3. (Adapted from sources on the Internet) A farmer grows a bushel of wheat and sells it to a miller for $1. The miller turns it into flour and then sells the flour to a baker for $3. The baker uses the flour to bake bread and sells it to an engineer for $6. The engineer eats the bread. How does this contribute to GDP? What is the value added by each person?

4. (Adapted from MIT Open University) There are an orange farm and an orange juice company in a country called Orangeland. Orangelanders live only on orange juice. In 1992, the orange farm produced 10 oranges, and sold them to the orange juice company at $1 each. The orange juice company produced 3 bottles of orange juice, and sold them all at a unit price of $10 plus 10% indirect tax collected by government (so the price paid was actually $11). The orange farm paid total wages of $6. The orange juice company paid total wages of $10. The orange juice company also had to pay $4 to replace the orange juice extractor that was not working properly due to its use during 1992 (depreciation). Both companies retained 50% of their profits and paid the rest of it as dividends to the households. After receiving their wage income and their dividends, the households paid a 10% direct tax on their total income to the government. The government bought one orange juice bottle. (Notice that the firms are not paying any direct taxes on their retained profits)
Compute the GDP of Orangeland using the value added, expenditure, and income approaches.

5. 5. If nominal GDP is 8,820 and the GDP deflator is 105, then real GDP is ….

6. Assume that only three goods are produced in a hypothetical economy. The following table gives Output (Q) and Price (P) information concerning goods X, Y, and Z. Find out the real GDP growth in 1995 prices from 1995 to 2000 and 2000 to 2005.

	1995		**2000**		**2005**	
Good	**Q**	**P**	**Q**	**P**	**Q**	**P**
X	1	$1	2	$4	2	$1.5
Y	2	$2	1	$1.5	2	$1.5
Z	3	$0.5	6	$3	4	$4