8. Yes, it is possible for economists to agree about the effects of a policy (that is, to agree on the positive analysis of the policy), but to disagree about the policy's desirability (normative analysis). For example, suppose economists agreed that reducing inflation to zero within the next year would cause a recession (positive analysis). Some economists might argue that inflation should be reduced, because they prefer low inflation even at the cost of higher unemployment. Others would argue that inflation isn't as harmful to people as unemployment is, and would oppose such a policy. This is normative analysis, as it involves a value judgment about what policy should be.

9. Classicals see wage and price adjustment occurring rapidly, while Keynesians think that wages and prices adjust only slowly to shocks. The classical theory implies that unemployment will not persist, since wages and prices adjust to bring the economy rapidly back to its full-employment equilibrium in response to a shock. But if Keynesian theory is correct, then the slow response of wages and prices means that unemployment may persist for long periods of time unless the government intervenes.

Numerical Problems

1. a. Average labour productivity is output divided by employment:

   2001: 12,000 tonnes of potatoes per 1000 workers = 12 tonnes of potatoes per worker

   2002: 14,300 tonnes of potatoes per 1100 workers = 13 tonnes of potatoes per worker

   b. The growth rate of average labour productivity is $[(13/12) - 1] \times 100\% = 8.33\%$.

   c. The unemployment rate is:

   2001: 100/1100 = 9.1%
   2002: 50/1150 = 4.3%

   d. The inflation rate is $[(2.5/2) - 1] \times 100\% = 25\%$.

2. The answers to this problem will vary depending on the current date. Numbers are at annual rates in billions of current dollars.

	2000	2001
GDP1,064.9	1,092.2	
Exports	484.3	473.0
Imports	428.9	416.4
Federal Revenues	179.9	193.7
Federal Expenditures	173.0	184.0
a.		
Exports/GDP	45.4 %	43.3 %
Imports/GDP	40.3 %	38.13%
Trade imbalance/GDP	5.2 %	5.2 %

In terms of income, Gilligan's income is clearly worth 200 fish (100 fish plus 200 coconuts worth 100 fish). The Professor's income is less easily calculated, because he uses 100 fish to fertilize the coconut trees. These 100 fish are therefore not income to him. Thus the Professor's income is 800 coconuts (1000 coconuts minus the 200 coconuts paid to Gilligan) plus 300 fish (500 fish minus 100 fish paid to Gilligan and minus 100 fish used as fertilizer). In terms of fish, the Professor's income is 700 fish.

This question illustrates some of the nuances of national income accounting. Many difficult choices and measurement issues are involved in constructing the accounts. Here, for example, it is clear that what we call consumption really isn't just the amount of goods consumers use up during the year, but also includes consumption goods that are purchased but saved for the future. Since there is no way to measure when goods are used after they are purchased, the accounts are unable to distinguish consumption from storage of goods.

Another subtlety is the treatment of the fish used as fertilizer. If the fertilizer increases *future* output rather than current output, then the fertilizer is not used up during the year and represents investment of 100 fish. In this case, GDP would equal 1000 fish, consumption is 900 fish, investment is 100 fish, the Professor's income is 800 fish, and Gilligan's income is 200 fish.

2. a. Furniture made in Quebec that is bought by consumers counts as consumption, so consumption increases by $6 billion, investment is unchanged, government purchases are unchanged, net exports are unchanged, and GDP increases by $6 billion.

   b. Furniture made in Sweden that is bought by consumers counts as consumption and imports, so consumption increases by $6 billion, investment is unchanged, government purchases are unchanged, net exports fall by $6 billion, and GDP is unchanged.

   c. Furniture made in Quebec that is bought by businesses counts as investment, so consumption is unchanged, investment increases by $6 billion, government purchases are unchanged, net exports are unchanged, and GDP increases by $6 billion.

   d. Furniture made in Sweden that is bought by businesses counts as investment and imports, so consumption is unchanged, investment increases by $6 billion, government purchases are unchanged, net exports decline by $6 billion, and GDP is unchanged.

3. a. ABC produces output valued at $2 million and has total expenses of $1.3 million ($1 million for labour, $0.1 million interest, $0.2 million taxes). So its profits are $0.7 million. XYZ produces output valued at $3.8 million ($3 million for the three computers that were sold, plus $0.8 million for the unsold computer in inventory) and has expenses of $3.2 million ($2 million for components, $0.8 million for labour, and $0.4 million for taxes). So its profits are $0.6 million.

According to the product approach, the GDP contributions of these companies are $3.8 million, the value of the final product of XYZ. ABC's production is of an intermediate good, used completely by XYZ, and so is not counted in GDP.

According to the expenditure approach, the GDP contribution is also $ 3.8 million, with $3 million (of sold computers) adding to the capital stock (as investment spending), and $0.8 million (the unsold computer) as inventory investment.

The income approach yields the same GDP total contribution. The amounts are:

	ABC	XYZ	Total
Labour	$1.0 million	$0.8 million	$1.8 million
Profit	$0.7 million	$0.6 million	$1.3 million
Taxes	$0.2 million	$0.4 million	$0.6 million
Interest	$0.1 million	$0.0 million	$0.1 million

Total of all incomes = $3.8 million

b. If ABC pays an additional $.5 million for computer chips from abroad, the results change slightly. The correct answer is easiest to see using the expenditure approach. As in part a, there is $3.8 million expenditure on final goods, but not there are also net exports of –$5 million. So the total expenditure on domestically produced goods is only $3.3 million. The product approach gets the same answer if it is realized that the $.5 million is a contribution to GDP of the country in which the chips were made, and so must be deducted from the GDP of Canada. The value added in Canada is only $3.3 million. Finally, the income approach gives the same answer as in part a, except that the cost of importing the chips reduces ABC's profits by $.5 million, so the sum of the incomes is only $3.3 million.

4. a. Product approach: $50 = lumber store's value added = $200 product minus $150 value of product produced in the previous year. Expenditure approach: $200 consumption spending plus inventory investment of –$150. Income approach: $50 paid to the factors of production at the lumber store (wages of employees, interest, taxes, profits).

b. Product approach: $60 thousand broker's fee for providing brokerage services.

Expenditure approach: $60 thousand counts as residential investment made by the home buyer. The important point here is that the transfer of an existing good, even at a higher value than that at which it was originally sold, does not add to GDP. Income approach: $60 thousand income to the broker for wages, profits, etc.

c. Product approach: $20 thousand salary plus $8 thousand child care equals $28 thousand. Note that there is a sense in which the child care is an intermediate service and should not be counted, because without it the homemaker would not be able to work. But in practice there is no way to separate such intermediate services from final services, so they are all added

to GDP Expenditure approach: $28 thousand ($8 thousand consumption spending on child care services plus $20 thousand in categories that depend on what job the homemaker has). Income approach: $28 thousand ($20 thousand compensation of homemaker plus $8 thousand income to the factors producing the child care: employees' wages, interest, taxes, profits).

d. Product approach: $100 million of a capital good. Since it is produced with local labour and materials, and assuming no payments go to Japanese factors of production, this is all added to Canadian GDP. Expenditure approach: $100 million net exports, since the plant is owned by the Japanese. (It is not part of gross domestic investment because the plant is not a capital good owned by Canadian residents.) Income approach: $100 million paid to Canadian factors of production.

e. Product approach: $0 because nothing is produced. Expenditure approach: $0 because this is a transfer, not a government purchase of goods or services. Income approach: $0, because this is not a payment to a factor of production, just a transfer.

f. Product approach: $5 thousand worth of advertising services. Expenditure approach: $5 thousand of government purchases. Income approach: $5 thousand compensation of employees.

g. Product approach: $120 million composed of $100 million of new cars produced plus $20 million of sales services provided by the consortium ($60 million sales price minus $40 million cost). Expenditure approach: $100 million by Hertz as investment plus $60 million by the public for consumption of the used cars minus $40 million of investment goods sold by Hertz, for a total of $120 million. Income approach: $100 million to the factors of production of GM plus $20 million in payments to the factors of production and profits for the consortium.

5. Given data: $I = 40$, $G = 30$, $GNP = 200$, $CA = -20 = NX + NFP$, $T = 60$, $TR = 25$, $INT = 15$, $NFP = 7 - 9 = -2$. Since $GDP = GNP - NFP$, $GDP = 200 - (-2) = 202 = Y$. Since $NX + NFP = CA$, $NX = CA - NFP = -20 - (-2) = -18$. Since $Y = C + I + G + NX$, $C = Y - (I + G + NX) = 202 - (40 + 30 + (-18)) = 150$.
$S_{pvt} = (Y + NFP - T + TR + INT) - C = (202 + (-2) - 60 + 25 + 15) - 150 = 30$. $S_{govt} = (T - TR - INT) - G = (60 - 25 - 15) - 30 = -10$. $S = S_{pvt} + S_{govt} = 30 + (-10) = 20$.

a. Consumption = 150

b. Net exports = -18

c. GDP = 202

d. Net factor payments from abroad = -2

e. Private saving = 30

f. Government saving = -10

g. National saving = 20

6. Base-year quantities at current-year prices: at base-year prices:

Apples	3000 x $3 =	$ 9,000	3000 x $2 =	$ 6,000
Bananas	6000 x $2 =	$12,000	6000 x $3 =	$18,000
Oranges	8000 x $5 =	$40,000	8000 x $4 =	$32,000
Total		$61,000		$56,000

Current-year quantities at current-year prices: at base-year prices:

Apples	4,000 x $3 =	$ 12,000	4,000 x $2 =	$ 8,000
Bananas	14,000 x $2 =	$ 28,000	14,000 x $3 =	$ 42,000
Oranges	32,000 x $5 =	$160,000	32,000 x $4 =	$128,000
Total		$200,000		$178,000

a. Nominal GDP is just the dollar value of production in a year at prices in that year.

Nominal GDP is $56 thousand in the base year and $200 thousand in the current year.

Nominal GDP grew 257% between the base year and the current year: [($200,000 /$56,000) - 1] x 100% = 257%.

b. Real GDP is calculated by finding the value of production in each year at base-year prices. Thus, from the table above, real GDP is $56,000 in the base year and $178,000 in the current year. In percentage terms, real GDP increases from the base year to the current year by [($178,000 / $56,000) - 1] x 100% = 218%.

c. The GDP deflator is the ratio of nominal GDP to real GDP. In the base year, nominal GDP equals real GDP, so the GDP deflator is 1. In the current year, the GDP deflator is $200,000 / $178,000 = 1.124. Thus the GDP deflator changes by [(1.124 / 1) -1] x 100% = 12.4% from the base year to the current year.

d. Nominal GDP rose 257%, prices rose 12.4%, and real GDP rose 218%, so most of the increase in nominal GDP is because of the increase in real output, not prices.

Notice that the quantity of oranges quadrupled and the quantity of bananas more than doubled.