# Sample Midterm 1 Questions

**Multiple choice questions:**

For the following question(s), suppose that an economy produces only food and clothing, and that price and quantity data are given in the table below.

| | Year 1 | |
|---|---|---|
| **Good** | **Quantity** | **Price** |
| Food | 20 | $6 |
| Clothing | 10 | $8 |
| | **Year 2** | |
| **Good** | **Quantity** | **Price** |
| Food | 25 | $10 |
| Clothing | 20 | $7 |

1) Year 1 nominal GDP is
A) $200.
B) $270.
C) $310.
D) $390.
E) $450.

2) Year 2 nominal GDP is
A) $200.
B) $270.
C) $310.
D) $390.
E) $450.

3) Suppose that Year 1 is the base year. Year 2 real GDP is
A) $200.
B) $270.
C) $310.
D) $390.
E) $450.

4) Suppose that Year 2 is the base year. Year 1 real GDP is
A) $200.
B) $270.
C) $310.
D) $390.
E) $450.

5) Suppose that GDP is equal to 1000, national saving is equal to 200, the current account deficit is equal to 100, and the government budget deficit is equal to 50. Private savings must equal

A) 150.
B) 200.
C) 250.
D) 300.
E) 350.

6) Comovement relates to

A) the relationship between real and nominal interest rates.
B) the movement between price levels and real GDP over time.
C) macroeconomic variables fluctuating together in patterns that exhibit strong regularities.
D) the movement of business cycles over time.
E) the frequency of the business cycles.

7) If deviations from trend in a macroeconomic variable are negatively correlated with deviations from trend in real GDP, that variable is said to be

A) useless in predicting future movements in real GDP.
B) procyclical.
C) countercyclical.
D) acyclical.
E) uncorrelated.

**TRUE/FALSE Questions**

Answer the following questions True, False, or Uncertain. Briefly explain your answers. No credit without explanation.

1. Inflation means that increases in real GDP are less than increases in nominal GDP.

2. Given the Cobb-Douglas production function, $Y = K^{\alpha}L^{1-\alpha}$, we know that the share of wages in national income is $(1 - \alpha) \cdot$ L.

3. Labor supply increases when the real wage increases.

**Problems**

1. Suppose households can earn a higher wage rate for working "overtime". That is, for the first q hours the household works, it receives a real wage of $w_1$, and for hours worked more than q it receives $w_2$, where $w_2 > w_1$. For simplicity, assume the household pays no taxes and receives no non-labor income.

(a) Draw the household's budget constraint, and depict its optimal choice of consumption and leisure.

(b) Show that the household would never work q hours, or anything very close to q hours. Explain this intuitively.

(c) Show what happens if the overtime wage, $w_2$, increases. Explain the results in terms of income and substitution effects. (Hint: Does it matter whether the household was initially working overtime?)

2. Consider a Cobb-Douglas production function with three inputs: K is capital (e.g., number of machines), L is labor (e.g., number of workers), and H is "human capital" (e.g., number of college degrees among the workers). Normalizing the scale factor Z to one gives us:

$Y = K^{\frac{1}{3}} H^{\frac{1}{3}} L^{\frac{1}{3}}$,

(a) Derive an expression for the marginal product of labor. How does an increase in the amount of human capital affect the marginal product of labor?

(b) Derive an expression for the marginal product of human capital. How does an increase in the amount of human capital affect the marginal product of human capital?

(c) What is the income share paid to labor? What is the income share paid to human capital? In the National Income Accounts of this economy, what share of total income do you think workers would appear to receive? (Hint: Consider where the return to human capital shows up).

(d) An unskilled worker earns the marginal product of labor, whereas a skilled worker earns the marginal product of labor plus the marginal product of human capital. Using the answers to (a) and (b), find the ratio of the skilled wage to the unskilled wage. How does an increase in the amount of human capital affect this ratio? Explain.

(e) Some people advocate government funding of college scholarships as a way of creating a more egalitarian society. Others argue that scholarships help only those who are able to go to college. Do your answers to the above questions shed light on this debate?

3. Suppose household preferences are described by the utility function

$$U(C, l) = C + \alpha ln(l),$$

where C stands for consumption of market goods and $l$ stands for leisure. For simplicity, assume there is no government in this economy.

(a) Assuming the market (real) wage is w and the total amount of time available is h, derive expressions for the household's consumption and labor supply decisions as a function of w and h. (For simplicity, assume the household has no nonmarket income). Does the income effect ever dominate the substitution effect? How does labor supply depend on income and consumption? Explain intuitively.

(b) Now suppose output, Y , is produced by competitive firms with technology Y = zN where N denotes labor inputs, and z is an index of productivity. Derive an expression of the firm's labor demand, and illustrate it with a graph.

(c) Using your answers to parts (a) and (b), derive an expression for the market clearing wage rate. How does the equilibrium wage change when z increases? How does the equilibrium wage change when $\alpha$ increases? Use a Labor Supply/Labor Demand graph to illustrate these changes.