

Recommended Exercises for Exam 1

Chapter 2

- Questions for Review: 1, 2, 3
- Problems and Applications: 2, 4, 6(a-b), 7

Chapter 3

- Questions for Review: 1, 2, 5, 7, 8
- Problems and Applications: 7, 8, 9, 10

Auxiliary Exercises

1. Use the data in *Table 1* to answer the following questions about GDP. Assume that cold cereal and running shoes were the only goods produced in 2000 and 2001.

Table 1. Production totals and per-unit prices for a hypothetical economy

	2000		2001	
	Price per unit	Qty Produced	Price per unit	Qty Produced
Cold Cereal	\$3.00	48	\$3.50	42
Running Shoes	\$58.00	8	\$60.00	10

- a. What was nominal GDP in 2000? What was nominal GDP in 2001?
- b. What was the annual rate of nominal GDP growth between 2000 and 2001?
- c. Use the fixed base year method with 2000 as a base year to calculate real GDP in 2000 and 2001.
- d. How does the growth rate of real GDP compare to the growth rate of nominal GDP?
- e. What would the estimated growth rate of real GDP be if 2001 were used as a base year instead?
- f. What is the GDP deflator in 2001, if 2000 is used as a base year?

g. Based on the GDP deflator, what is the annual rate of inflation between 2000 and 2001?

2. Use the data in *Table 1* to answer the following questions about the price level. Assume that the CPI market basket consists of 10 boxes of cereal and 2 pair of shoes.

- a. Using 2000 as the base year for prices, what is the value of the CPI in 2000?
- b. Using 2000 as the base year for prices, what is the value of the CPI in 2001?
- c. Based on the CPI in 2000 and 2001, what was the annual rate of inflation between 2000 and 2001?
- d. How does your answer to 2c compare to your answer for 1f? What accounts for the difference?

3. Explain why using the CPI to estimate cost of living increases probably leads to a systematic overstatement of the true rate of increase.

4. Describe the differences between the Consumer Price Index and the GDP deflator. Which is a Laspeyres index?

5. For each of the following, determine whether the person would be categorized by the Bureau of Labor Statistics as employed, unemployed, or not in the labor force. You may find it helpful to refer to the BLS definitions discussed [HERE](#).

- a. Terry has submitted applications with three companies for summer jobs. However, it is only April and she can't start work until at least June 15, because she is attending school.
- b. Dan is working 10 hours a week at McDonald's.
- c. Kasey applied for a job as a receptionist 3 weeks ago. She is currently awaiting the result of her application, and is not employed at any other job.
- d. Aaron completed his graduate degree in Philosophy last year. He is interested in an academic position, but after an unsuccessful job search gave up looking for work 3 months ago.

6. What is the "marginal product of labor"? What typically happens to the MPL when a firm increases the amount of labor it is employing, all else equal? What happens when it increases the amount of capital it employs? Explain.

7. Consider the aggregate production function: $Y = 15K^{1/3}L^{2/3}$.

- a. Assuming that capital (K) is fixed at 100, compute the marginal product of labor when labor is 10, 20, 30, and 40. Does this production function exhibit a diminishing marginal product of labor? Explain.
- b. Are labor and capital complements under this production function? Explain.
- c. Verify that this production function has the property of constant returns to scale.

8. Describe the difference between the real wage and the nominal wage. How is a nominal wage converted into its real equivalent?

9. Consider a perfectly competitive, profit maximizing firm facing the following marginal product functions and prices:

- $MPL = A/\sqrt{L}$;
- $MPK = A/4\sqrt{K}$;
- $W = \$20$
- $R = \$10$
- $P = \$2$

- a. What are the real wage and real rental price of capital that must be paid by this firm?
- b. If total factor productivity (A) is 100, how much labor (L) would this firm want to employ?
- c. How much capital (K) would this firm want to employ?
- d. What would happen to the firm's demand for labor and capital if total factor productivity increased from 100 to 150, all else equal?
- e. What would happen to the firm's demand for labor and capital if the nominal wage were to fall from \$20 to \$16, all else equal? *Assume that total factor productivity = 100.*

10. Use the classical model to predict the impact of each of the following shocks on a nation's real wage (W/P), real rental price of capital (R/P), and aggregate income (Y) all else equal. In each case, be sure to clearly state the predicted direction of change for all three variables, to justify your predictions with an intuitive explanation, and to depict the impact of the shock with the relevant diagrams.

- a. A wave of immigration increases the size of the labor force.
- b. A technological improvement raises total factor productivity.
- c. An earthquake destroys part of the capital supply

11. Consider the following model of a closed economy:

- $Y = AK^{1/2}L^{1/2}$
- $Y^d = C + I + G$
- $C = 300 + .7(Y - T)$
- $I = 2000 - 10,000r$
- $K^S = 100$
- $L^S = 225$
- $A = 24$
- $G = 200$
- $T = 600$

- a. What are the marginal product of labor and marginal product of capital **functions** for this economy? (*Hint: see page 56 of the text*)
- b. What must the real wage (W/P) and real rental price of capital (R/P) be to establish equilibrium in the labor and capital markets?
- c. What values of aggregate income (Y) and national saving (S) result from full employment of labor and capital?
- d. What must the interest rate (r) be in order to establish equilibrium in the market for loanable funds?
- e. How would the equilibrium values of Y , W/P , R/P , and r be affected if total factor productivity (A) increased from 24 to 30, all else equal?
- f. How would the equilibrium values of Y , W/P , R/P , and r be affected if government purchases (G) increased from 200 to 400, all else equal? *Assume TFP is fixed at 24.*

12. Describe the difference between the endogenous and the exogenous variables in an economic model? Which variables are exogenous in the classical model of a closed economy?

13. Use the classical model of a closed economy to predict the impact of each of the following shocks on the real wage (W/P), the real rental price of capital (R/P), aggregate income (Y), and the real interest rate (r), all else equal. In each case, be sure to clearly state the predicted direction of change for all four variables, to depict the impact of the shock with the relevant diagrams, and to explain your predictions intuitively in words.

- d. A wave of immigration increases the size of the labor force.
- e. A natural disaster reduces the size of the capital supply.
- f. The government reduces the amount of income taxes collected from households.
- g. Autonomous consumption declines.

