Chapter 8 (20)

Unemployment and Inflation

Chapter Summary

Unemployment and inflation are two of the most important macroeconomic issues. This chapter explores some of the fundamental facts about these economic variables.

The **unemployment rate** is the percentage of the labor force that does not have a job, but is actively looking for one. The chapter looks at how the unemployment rate and labor force are measured. It also examines current trends in labor force participation, unemployment by demographic characteristics (gender, race, and age), and different types of unemployment. There are three types of unemployment:

1. **frictional unemployment** is short-term unemployment.
2. **structural unemployment** arises when there is a mismatch between the skills workers have and the skills employers are looking for.
3. **cyclical unemployment** arises during a recession.

The **inflation rate** is the rate of change in the price level. There are three price indexes economists use to measure the price level: the **consumer price index** (*CPI*), the **GDP deflator**, and the **producer price index** (*PPI*). Price indexes are used to adjust nominal variables for the effects of inflation.

Learning Objectives

When you finish this chapter, you should be able to:

1. **Define unemployment rate and labor force participation rate and understand how they are computed.** The U.S. Bureau of Labor Statistics uses the results of the monthly household survey to calculate the unemployment rate and the labor force participation rate. The **labor force** is the total number of people who have jobs plus the number of people who do not have jobs, but who are actively looking. The **labor force participation rate** is the percentage of the working-age population in the labor force. Since 1950, the labor force participation rate of women has been rising, while the labor force participation rate of men has been falling. White men and women have below average unemployment rates. Teenagers and black men and women have above average unemployment rates. The typical unemployed person finds a new job or returns to his or her previous job within a few months. Each year, millions of jobs are created and destroyed in the United States.

2. **Identify the three types of unemployment.** There are three types of unemployment: frictional, structural, and cyclical. **Frictional unemployment** is short-term unemployment arising from the process of matching workers with jobs. **Structural unemployment** arises from a persistent mismatch between the job skills or attributes of workers and the requirements of jobs. **Cyclical unemployment** is caused by a business cycle recession. The **natural rate of unemployment** is the normal rate of

unemployment, consisting of structural unemployment and frictional unemployment. The natural rate of unemployment is also sometimes called the *full-employment rate of unemployment*.

3. **Explain what factors determine the unemployment rate.** Government policies can reduce the level of frictional and structural unemployment by aiding job search and worker retraining. Some government policies, however, can add to the level of frictional and structural unemployment. Unemployment insurance payments can raise the unemployment rate by extending the time that unemployed workers search for jobs. Government policies have caused the unemployment rates in most other industrial countries to be higher than in the United States. Wages above market levels can also increase unemployment. Wages may be above market levels because of the minimum wage, labor unions, and **efficiency wages**.

4. **Define price level and inflation rate and understand how they are computed.** The **price level** measures the average prices of goods and services. The **inflation rate** is equal to the percentage change in the price level from one year to the next. The federal government compiles statistics on three different measures of the price level:

    ▪   the consumer price index (*CPI*)
    ▪   the GDP price deflator
    ▪   the producer price index (*PPI*)

    The **consumer price index** is an average of the prices of goods and services purchased by the typical urban family of four. Changes in the consumer price index are the best measure of changes in the cost of living as experienced by the typical household. Biases in the construction of the CPI cause changes in it to overstate the true inflation rate by about one-half of a percentage point. The **producer price index** is an average of prices received by producers of goods and services at all stages of production.

5. **Use price indexes to adjust for the effects of inflation.** Price indexes are designed to measure changes in the price level over time, not the absolute level of prices. To correct for the effects of inflation, we can divide a nominal variable by a price index and then multiply the result by 100 to obtain a real variable. The real variables will be measured in dollars of the base year for the price index.

6. **Distinguish between the nominal interest rate and the real interest rate.** The stated interest rate on a loan is the **nominal interest rate**. The **real interest rate** is the nominal interest rate minus the inflation rate. Because it is corrected for the effects of inflation, the real interest rate provides a better measure of the true cost of borrowing and the true return to lending than does the nominal interest rate.

7. **Discuss the problems that inflation causes.** Inflation does not reduce the affordability of goods and services to the average consumer. When inflation is anticipated, its main costs are that paper money loses some of its value and firms incur menu costs. **Menu costs** include the costs of changing prices on products and printing new catalogs. When inflation is unanticipated, the actual inflation rate can turn out to be different from the expected inflation rate. As a result, some people gain and some people lose.

Chapter Review

Chapter Opener: Alcatel-Lucent Contributes to Unemployment (pages 238-239)

In 2001, total employment in the United States declined. One company that contributed to this decline was Lucent Technologies, a leading technology firm. By 2005, Lucent employed 31,500 workers in contrast to the 175,000 workers that they employed in 2001. Lucent merged with the French firm Alcatel to become Alcatel-Lucent. Disappointing earnings, due to strong competition from other firms such as Ericsson (of Sweden) and Huawei (of China) and shifts in spending from some North American customers, led Alcatel-Lucent to eliminate an additional 12,500 jobs.

📖 Helpful Study Hint

Read *An Inside Look* at the end of the chapter for more information on how to make sense of 2007 employment data from the U.S. Department of Labor.

If you graduate during a recession, will that affect which jobs you apply for? *Economics in YOUR Life!* at the start of this chapter poses this question. Keep the question in mind as you read the chapter. The authors will answer the question at the end of the chapter.

8.1 LEARNING OBJECTIVE

8.1 Measuring the Unemployment Rate and the Labor Force Participation Rate (pages 240–247)

Learning Objective 1 Define unemployment rate and labor force participation rate and understand how they are computed.

Our measures of unemployment come from a survey conducted each month by the U.S. Bureau of the Census. The *Current Population Survey,* often referred to as the household survey, collects the data needed to compute the unemployment rate. The survey asks questions about the employment status of people in the household and attempts to determine if a worker is employed, out of the work force (not employed nor looking for a job), or unemployed. The sum of employed and unemployed persons in the economy is known as the **labor force**. The **unemployment rate** is the percentage of the labor force that cannot find work. People who are not actively looking for a job are not considered to be a part of the labor force. This includes **discouraged workers** as well as retirees, homemakers, full-time students, and people on active military service, in prison, or in mental hospitals. The **labor force participation rate** is the percentage of the working age population that is in the labor force. Working age is defined as 16 years or older.

The results of the Current Population Survey provide the data to calculate unemployment rates and labor force participation rates. These two statistics are more precisely defined as:

$$\text{Unemployment rate} = \frac{\text{Number of Unemployed}}{\text{Labor Force}} \times 100$$

$$\text{Labor Force Participation Rate} = \frac{\text{Labor Force}}{\text{Working Age Population}} \times 100$$

📖 Helpful Study Hint

Figure 8-1 shows various segments of the population and labor force. In which category do you fall at this stage of your life?

- If you are a traditional college student who does not work, you are not in the labor force and not available for work.
- If you attend college and also work part-time, you are in the labor force.
- If you attend college and want to work but can't find a job and have stopped looking, you are not in the labor force and you are considered a discouraged worker.

The unemployment and labor force data provide a useful picture of employment, but the measures are not perfect due to sampling and reporting errors in the survey. For instance, there some people who are not counted in the labor force who might still be considered unemployed. Discouraged workers, for example, are workers who have dropped out of the labor force because they believe no jobs are available for them. These workers are not included in the measured unemployment rate, and if included would raise the measured unemployment rate.

Helpful Study Hint

Figure 8-2 and Figure 8-3 show trends in the labor force participation rate of men, women, and other demographic groups in the United States. In Figure 8-2, notice that the participation rate of women increased rapidly in the 1960s and 1970s before leveling off in recent years. The participation rate of men has steadily declined over the years. A gap still exists between male and female labor force participation rates, although it is much smaller today than it was 60 years ago. In Figure 8-3, notice that the average unemployment rate is 4.5 percent. White adults fall slightly below that rate, while white teenagers, Hispanic teenagers, and black teenagers have much higher unemployment rates.

📖 Helpful Study Hint

For an additional discussion of nonworking men, look at the ***Making the Connection: What Explains the Increase in "Kramers"?*** How do men such as the character Cosmo Kramer on Seinfeld support themselves without ever holding a job? In recent years, there has been an increase in the number of men between ages 22 and 54 who are not in school and do not have a paid job. About half of these individuals receive Social Security Disability Insurance, and many rely on other household members for food, clothing, and spending money. Recent studies have shown these men are not substituting nonmarket work, such as childcare, but are instead engaged in leisure activities.

In addition to the Current Population Survey, the establishment survey, or the payroll survey, is another way for the Department of Labor to measure total employment in the economy. The establishment survey provides information on the total number of people who are employed and on a company payroll by surveying about 300,000 business establishments. The establishment survey has the following drawbacks:

1. Does not provide information on the number of self-employed persons.
2. Fails to count people employed at newly opened businesses.
3. Does not provide information on the unemployed.

8.2 Types of Unemployment (pages 248–250)

Learning Objective 2 Identify the three types of unemployment.

It is useful to divide unemployment into three types: frictional, structural, and cyclical. **Frictional unemployment** includes unemployed workers who have left one job and are looking for another job or are out of a job due to seasonal factors. Frictionally unemployed people usually find new jobs quickly. **Structural unemployment** includes workers who have lost their jobs because their skills do not match those employers want. Structurally unemployed workers are usually out of work longer than those who are frictionally unemployed because they must learn new job skills, which takes time. **Cyclical unemployment** occurs when workers lose jobs due to a recession. As the economy begins to recover, these workers are sometimes rehired by the same firms that laid them off.

When the only types of unemployment are structural and frictional, the economy is said to be at full employment. Sometimes this is also referred to as the **natural rate of unemployment**.

> ## 📖 Helpful Study Hint
>
> For an additional discussion of the three types of unemployment and company layoffs, read *Making the Connection: How Should We Categorize the Unemployment at Alcatel-Lucent?* The lost jobs at Alcatel-Lucent can be attributed to three reasons:
> 1. The recession in 2001, which caused cyclical unemployment.
> 2. The reduction in the demand for telecommunication products, which caused optical engineers to have a difficult time finding new jobs. This is a form of structural unemployment.
> 3. The trouble that Alcatel-Lucent had competing with other telecommunication firms. These job losers are frictionally unemployed. The distinction between the three types of unemployment is not always clear.

Extra Solved Problem 8-2

Chapter 8 of the textbook includes two Solved Problems. Here is an extra Solved Problem to help you build your skills solving economic problems:

The Reason for Unemployment

Supports Learning Objective 2: Identify the three types of unemployment.

The BLS collects data about the reasons people are unemployed. Some of this data is in the table below (the numbers are in thousands).

	Unemployment		Reason for unemployment					
			Job losers			Job		New
				On				
Year	Rate	Number	Total	layoff	Other	leavers	Reentrants	entrants
2000	4.0	5,692	2,517	852	1,664	780	1,961	434
2001	4.7	6,801	3,476	1,067	2,409	835	2,031	459
2002	5.8	8,377	4,607	1,124	3,483	866	2,368	536
2003	6.0	8,774	4,838	1,121	3,717	818	2,477	641
2004	5.5	8,149	4,197	998	3,199	858	2,408	686
2005	5.1	7,591	3,667	933	2,734	872	2,386	666
2006	4.6	7,001	3,321	921	2,400	827	2,237	616

a.   Calculate the percentage of the unemployed who have just lost their jobs and the percentage who have left their jobs.

b.   Calculate the percentage of the unemployed who are unemployed as the result of entering the labor force, either for the first time or as a reentrant.

SOLVING THE PROBLEM

Step 1:   Review the chapter material.
This problem is about definitions of unemployment, so you may want to review the section "Types of Unemployment," which begins on page 248 in the textbook.

Step 2:   Answer question (a) by calculating the percentages of unemployed.
For example, the percentage of job losers in 2002 can be calculated as: (4,607/8,377) x 100 = 55.0%. The percentage of reentrants and new entrants in 2002 is: [(2,368 + 536)/8,377] x 100 = 34.7%. The percentages for the three categories in each year are:

	Percentages of those unemployed due to		
Year	Job losers	Job leavers	Reentrants and new entrants
2000	44.2%	13.7%	42.1%
2001	51.1	12.3	36.6
2002	55.0	10.3	34.7
2003	55.1	9.3	35.5
2004	51.5	10.5	38.0
2005	48.3	11.5	40.2
2006	47.4	11.8	40.8

Step 3: **Answer part (b) by comparing the different sources of unemployment.**

Notice that the major source of unemployment is job losers, followed by reentrants and new entrants. The majority of the reentrants and new entrants group is reentrants, which are people who lost or quit jobs in the past, dropped out of the labor force for some reason, and are now looking for jobs.

8.3 LEARNING OBJECTIVE

8.3   Explaining Unemployment (pages 250–254)

Learning Objective 3   Explain what factors determine the unemployment rate.

The business cycle is the cause of cyclical unemployment. Frictional and structural unemployment are influenced by government policies, such as unemployment insurance. This insurance program provides payments of about half the average wage to provide unemployed workers with some income while they search for a new job. Unemployment insurance helps workers take sufficient time to find a job that is a good match for their skills. Unfortunately, as workers spend more time searching, they are also unemployed longer, increasing the unemployment rate. Unemployment insurance also helps the unemployed maintain their income and lessens the severity of a recession. The minimum wage also has an impact on the unemployment rate, particularly for teenage workers. By forcing employers to pay some workers a wage above the market equilibrium wage, the minimum wage contributes to increased unemployment among those with few job skills. Firms may also pay a wage above the market level, called an **efficiency wage**, which is designed to increase worker productivity. This higher wage may result in the quantity demanded of labor being less than the quantity supplied. The result can be unemployment, even when cyclical employment is zero. Labor unions can also temporarily increase unemployment by bargaining for wages that are higher than the equilibrium level. Workers who are unable to find employment in the unionized sector can generally find employment—possibly for lower wages—in the non-unionized sector. Unions have a relatively small impact on labor markets in the United States because only about 9 percent of non-government workers are members of unions.

📖 Helpful Study Hint

For an additional discussion of efficiency wages, read ***Making the Connection: Why Does Costco Pay Its Workers So Much More Than Wal-Mart Does?*** In 2007, the average wage of a Wal-Mart hourly employee was about $10.50 per hour, while the average wage of a Costco hourly employee was $17.00 per hour. Costco's benefits are also more generous, with about 90 percent of employees covered by medical

insurance, as opposed to about 50 percent at Wal-Mart. The difference in wages is attributed to Costco paying an efficiency wage. Costco argues that paying a higher wage reduces employee turnover and raises morale and productivity. However, some economists argue that because Costco carries higher priced goods, it "requires higher-skilled workers to sell higher-end products to its more affluent customers." If this view is correct, then the high wages at Costco may not be entirely due to efficiency wage considerations.

Extra Solved Problem 8-3

Chapter 8 of the textbook includes two Solved Problems. Here is an extra Solved Problem to help you build your skills solving economic problems:

Unemployment Insurance

Supports Learning Objective 3: Explain what factors determine the unemployment rate.

Suppose the U.S. government increases the length of time that an unemployed worker can receive unemployment insurance benefits. Predict how this will influence the unemployment rate.

SOLVING THE PROBLEM

Step 1: Review the chapter material.
This problem is about the effects of government policy on unemployment rates, so you may want to review the section "Government Policies and the Unemployment Rate," which begins on page 250 in the textbook.

Step 2. Predict the effects.
If the government extends the period for receiving unemployment insurance payments, the extension will reduce the opportunity cost of unemployment. This may cause some workers to continue their search for employment, increasing the duration of unemployment, the level of unemployment, and the unemployment rate.

8.4 LEARNING OBJECTIVE

8.4 Measuring Inflation (pages 254-258)

Learning Objective 4 Define price level and inflation rate and understand how they are computed.

The **price level** measures the average prices of goods and services in the economy, while the **inflation rate** is the percentage increase in the price level from one year to the next. There are several price indexes. The GDP deflator measures the average price of all goods and services included in GDP. The **consumer price index (CPI)** measures the average price of the goods and services purchased by a typical urban household. The **producer price index (PPI)** measures the average price paid by firms for intermediate goods. Any price index is the average price of a set of goods and services. These price

indexes differ in terms of which goods are included in them and in terms of how the index is calculated. The GDP deflator is the ratio of nominal GDP to real GDP multiplied by 100:

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

The GDP deflator is an average of the prices of all final goods and services produced during a year. The CPI includes goods and services purchased by consumers. Every two years, the BLS does a large-scale survey to determine the goods and services a typical urban household purchases. The CPI is the ratio of the current value of that market basket of goods and services to the value of that basket in the base year multiplied by 100:

$$\text{CPI} = \frac{\text{Expenditures in the current year}}{\text{Expenditures in the base year}} \times 100$$

📖 Helpful Study Hint

Remember that a value of the CPI of 201 (the value for 2006), means that in that year, the average price of the market basket has increased 101 percent from the base year (the average of 1982-84). What additional information would you need to calculate the inflation rate for that year compared to the previous year? (Answer: You would need the value of the CPI for 2005.) Suppose the CPI was 82 (the value for 1980). What does that number tell us about the price level relative to the base year? (Answer: It tells us that the price level in 1980 was 18 percent lower than in the base year.)

The PPI is a measure of the average prices received by producers at all stages of production. The PPI includes intermediate goods and may sometimes give an early warning of possible future movements in the CPI.

Regardless of which price index you use, the inflation rate is the rate of change in the index from one year to the next. In the following formula, t refers to the current year and $t-1$ refers to the previous year:

$$\text{Inflation Rate}_t = \frac{\text{Price Index}_t - \text{Price Index}_{t-1}}{\text{Price Index}_{t-1}} \times 100$$

📖 Helpful Study Hint

The feature ***Don't Let This Happen to YOU!*** appears in this and other chapters to show you how to avoid mistakes often made by economics students. In this chapter, remember that the CPI number by itself provides a comparison to the base year and is not the inflation rate. A CPI value in 2006 of 202 implies that prices have risen 102 percent from the *base year*. The inflation rate compares the price level in one year to the price level in the previous year. For example, because the CPI in 2005 was 198, the 2006 CPI inflation rate was 2.0 percent: [(202 − 198)/198] x 100 = 2.0 percent.

📖 Helpful Study Hint

> Remember that if the inflation rate falls between two years, (for example, if it is 5 percent one year and 4 percent the next year), then prices are still rising, but at a smaller rate of increase. Economists call a decline in the inflation rate *disinflation*.

Because the CPI is the most widely used measure of inflation, it is important that the CPI be as accurate as possible. There are however, four reasons why the CPI inflation rate overstates the true inflation rate:

1. The CPI has a substitution bias because it is constructed with the assumption that people buy the same goods and services and do not substitute to lower price goods and services as relative prices change.
2. The CPI does not fully take into account increases in the quality of products over time. For example, the price of a particular car model might increase from one year to the next, but part of that increase may be due to improvements in the car's safety and gas mileage. Because of increases in quality, increases in prices overstate the true rate of inflation.
3. Sometimes older products are replaced with new less expensive products. If these newer products, such as HD-DVD players, are not properly included in the CPI market basket, then decreases in their prices will be reflected in the inflation rate.
4. The CPI collects data from traditional stores, and does not sample prices at less expensive outlet stores such as Sam's Club, creating an outlet bias.

Extra Solved Problem 8-4

Chapter 8 of the textbook includes two Solved Problems. Here are two extra Solved Problems to help you build your skills solving economic problems:

Calculating the CPI

Supports Learning Objective 4: Define price level and inflation rate and understand how they are computed.

The CPI compares the cost of a market basket of goods with the cost of the same quantities of goods and services in the base year. Suppose that the basket includes (1) admission for two to the local theatre for a Friday evening movie, (2) a large popcorn at the theatre, (3) a large pepperoni pizza (carry-out from the local pizza place), and (4) a two-liter bottle of diet Coke.

Year	Theatre Admission for One Person	Popcorn	Pizza	Diet Coke
1	$5.00	$2.00	$12.00	$1.25
2	6.00	2.50	12.50	1.40
3	6.50	3.00	13.00	1.50

Calculate the value of the market basket in each year.

SOLVING THE PROBLEM

Step 1: **Review the chapter material.**
This problem is about using a price index to measure inflation, so you may want to review the section "Measuring Inflation," which begins on page 254 of the textbook.

Step 2: **Determine the value of the market basket.**
The value of the market basket is the sum of the prices of each good or service multiplied by the quantity of that good or service in the basket. (The basket above has two theater admissions but one of each of the other goods.) The value of the market basket in year 2 will be (2 x $6.00) + (1 x $2.50) + (1 x $12.50) + (1 x $1.40) = $28.40. The table below also gives the value of the market basket for years 1 and 3.

Step 3: **Calculate the CPI and CPI inflation rates for each year.**
The CPI is the ratio of the value of the market basket in a given year to the value of the market basket in the base year. Once we have calculated the CPI, we can also calculate the CPI inflation rate. These values are in the table below.

Year	Value of the Basket	CPI	Inflation
1	$25.25	100.0	–
2	28.40	112.5	12.5%
3	30.50	120.8	7.4

Comparing Inflation Rates

Supports Learning Objective 4: Define price level and inflation rate and understand how they are computed.

Below are price level data for the GDP deflator, the consumer price index (CPI), and the producer price index (PPI) for the period 2000-2006. Calculate the inflation rates for each of these price indexes for each time period. Do the different price indexes give the same inflation rate? The data are from the *Economic Report of the President*, found online at: http://www.gpoaccess.gov/eop/.

Year	GDP Deflator	CPI	PPI
2000	100.0	172.2	138.0
2001	102.4	177.1	140.7
2002	104.1	179.9	138.9
2003	106.4	184.0	143.3
2004	109.4	188.9	148.5
2005	112.7	195.3	155.7
2006	116.0	201.6	160.3

SOLVING THE PROBLEM

Step 1: **Review the chapter material.**
This problem is about using a price index to measure inflation, so you may want to review the section "Measuring Inflation," which begins on page 254 of the textbook.

Step 2: **Use the inflation formula.**

$$\text{Inflation Rate}_t = \frac{\text{Price Index}_t - \text{Price Index}_{t-1}}{\text{Price Index}_{t-1}} \times 100$$

	GDP Deflator Inflation Rate	CPI Inflation Rate	PPI Inflation Rate
2001	2.4%	2.8%	2.0%
2002	1.7	1.6	−1.3
2003	2.2	2.3	3.2
2004	2.8	2.7	3.6
2005	3.0	3.4	4.8
2006	2.9	3.2	3.0

Notice that while the numbers are different, because each price index measures the price level differently, they show a similar pattern. So which is the correct inflation rate? The answer is all are the correct inflation rate. The inflation rate measures a rate of change in prices. There are many ways to measure prices. Each measurement implies a different inflation rate.

8.5 LEARNING OBJECTIVE

8.5 Using Price Indexes to Adjust for the Effects of Inflation (pages 258–260)

Learning Objective 5 Use price indexes to adjust for the effects of inflation.

Price indexes, such as the CPI, give us a way of adjusting for the effects of inflation so that we can compare the purchasing power of dollar values in different years. The formula we would use to calculate the value in 2006 dollars of a good or service in the year 2000 would be:

$$\text{Value in 2006 dollars} = \text{Value in 2000 dollars} \times \frac{\text{CPI in 2006}}{\text{CPI in 2000}}$$

For example, suppose a pizza and two drinks from the local pizza place cost $7.99 in 2000. If the CPI in 2006 is 201 and the CPI in 2000 is 172, then the value of the pizza and two drinks in 2006 dollars is

$$\text{Value in 2006 dollars} = \$7.99 \times \frac{201}{172} = \$9.34$$

📖 Helpful Study Hint

Read *Solved Problem 8-5* in the textbook for more details on how to calculate changes in real wages.

8.6 Real versus Nominal Interest Rates (pages 260-262)

Learning Objective 6 Distinguish between the nominal interest rate and the real interest rate.

The interest rate is the return to lending or the cost of borrowing. If you lend $100 at a 5 percent interest rate, you will receive $5.00 in interest one year from now. If there is inflation over that year, the $5.00 will not buy the same amount of goods and services at the end of the year as at the beginning of the year. The **nominal interest rate** is the stated interest rate on a loan. The **real interest rate** adjusts the nominal interest rate for inflation. The real interest rate is defined as:

$$\text{Real Interest Rate} = \text{Nominal Interest Rate} - \text{Inflation Rate}$$

The real interest rate provides a better measure of the true cost of borrowing and the true rate of return to lending than does the nominal interest rate. In a period of **deflation**, where the inflation rate is negative (the price level is falling), the real interest rate will be larger than the nominal interest rate.

Extra Solved Problem 8-6

Chapter 8 of the textbook includes two Solved Problems. Here is an extra Solved Problem to help you build your skills solving economic problems:

Nominal and Real Interest Rates

Supports Learning Objective 6: Distinguish between the nominal interest rate and the real interest rate.

The table below contains interest rate data on bonds issued by large corporations. In this case, the bonds have received a "AAA" rating, which means that the corporations that issued the bonds are not likely to go out of business. The table also shows the inflation rate calculated using the CPI. Calculate the real interest rate and compare changes in the nominal and real interest rates.

Year	AAA bond interest rate (nominal interest rate)	CPI inflation rate
2001	7.1%	2.9%
2002	6.5	1.6
2003	5.7	2.3
2004	5.6	2.7
2005	5.2	3.4
2006	5.6	3.2

SOLVING THE PROBLEM

Step 1: **Review the chapter material.**
This problem is about calculating the real interest rate, so you may want to review the section "Real versus Nominal Interest Rates," which begins on page 260 of the textbook.

Step 2: **Use the real interest rate formula.**

$$\text{Real Interest Rate} = \text{Nominal Interest Rate} - \text{Inflation Rate}$$

The resulting real interest rates are:

Year	AAA bond interest rate (nominal rate)	CPI inflation rate	AAA bond Interest Rate (real rate)
2001	7.1%	2.9%	4.2%
2002	6.5	1.6	4.9
2003	5.7	2.3	3.4
2004	5.6	2.7	2.9
2005	5.2	3.4	1.8
2006	5.6	3.2	2.4

Notice that because the inflation rate is positive during each year, the real interest rate is always smaller than the nominal interest rate. Also notice that the patterns are sometimes different. For instance, from 2001-2002, the nominal interest rate fell from 7.1% to 6.5%, while the real interest rate increased from 4.2% to 4.9%. But, if we examine 2005-2006 changes, both the nominal and the real interest rates increased (though by different amounts).

8.7 LEARNING OBJECTIVE

8.7 Does Inflation Impose Costs on the Economy? (pages 262-265)

Learning Objective 7 Discuss the problems that inflation causes.

Inflation affects the distribution of income and can, in turn, hurt some people. For example, people on fixed nominal incomes—such as retired people who rely on company pensions that pay them a fixed amount each month—are hurt by inflation. As prices rise, their incomes do not rise, so they are able to buy fewer goods and services. Inflation can be characterized as anticipated or unanticipated. Anticipated inflation imposes costs by reducing the purchasing power of assets, such as money in a checking account. Anticipated inflation can also create additional costs to firms from raising prices—these costs are called **menu costs**. Unanticipated inflation can affect the distribution of income, causing some people to gain and some people to lose.

📖 Helpful Study Hint

For an additional discussion of the effects of inflation, read *Making the Connection: Why a Lower Inflation Rate is Like a Tax Cut for Alcatel-Lucent's Bondholders*. To keep the same real rate of interest, if the inflation rate is higher, the nominal interest rate must also be higher.

These higher nominal interest rates result in higher tax payments, so that when adjusted for inflation, real after-tax interest payments will be larger at a lower inflation rate. Inflation influences the cost of issuing a bond and the return received by the buyer of the bond.

📖 Helpful Study Hint

Economics in YOUR Life! at the end of the chapter answers the question posed at the start of the chapter: If you graduate during a recession, how will it affect your job search? Should you change careers? What we have seen in the chapter is that recessions generally are short and are followed after a year or so by expansions. This would suggest that it is not worth a major change in life plans because of a temporary event. A possible action is to wait out the recession and perhaps consider this as a time to pursue a master's degree.

Key Terms

Consumer Price Index (CPI). An average of the prices of the goods and services purchased by the typical urban family of four.

Cyclical unemployment. Unemployment caused by a business cycle recession.

Deflation. A decline in the price level.

Discouraged workers. People who are available for work, but who have not looked for a job during the previous four weeks because they believe no jobs are available for them.

Efficiency wage. A wage higher than the market wage paid by a firm in order to increase worker productivity.

Frictional unemployment. Short-term unemployment arising from the process of matching workers with jobs.

Inflation rate. The percentage increase in the price level from one year to the next.

Labor force. The sum of employed and unemployed workers in the economy.

Labor force participation rate. The percentage of the working-age population in the labor force.

Menu costs. The costs to firms of changing prices.

Natural rate of unemployment. The normal rate of unemployment, consisting of structural unemployment plus frictional unemployment.

Nominal interest rate. The stated interest rate on a loan.

Price level. A measure of the average prices of goods and services in the economy.

Producer Price Index (PPI). An average of the prices received by producers of goods and services at all stages of the production process.

Real interest rate. The nominal interest rate minus the inflation rate.

Structural unemployment. Unemployment arising from a persistent mismatch between the skills and characteristics of workers and the requirements of jobs.

Unemployment rate. The percentage of the labor force that is unemployed.

Self-Test

(Answers are provided at the end of the Self-Test.)

Multiple-Choice Questions

1. The "misery index" gives a rough measure of the state of the economy by
   a. establishing the success or failure of government spending on social programs.
   b. determining why the economy is unable to generate a higher level of real GDP per person.
   c. adding together the inflation and unemployment rates.
   d. monitoring changes in the number of people on the welfare rolls.

2. The *Current Population Survey*, conducted by the U.S. Bureau of the Census and often referred to as the household survey, is a sample of _____ households, and asks about the employment status of everyone in the household _____ and older.
   a. 1,000; 18 years of age
   b. 5,000; 21 years of age
   c. 60,000; 16 years of age
   d. 80,000; 19 years of age

3. Which of the following groups is included in the *labor force*?
   a. the unemployed
   b. retirees, homemakers, and full-time students
   c. people who could have a civilian job but are on active military service, in prison, or in mental hospitals
   d. none of the above

4. With respect to statistics on the labor market, we can say that
   a. the labor force is the sum of the employed and unemployed.
   b. the unemployment rate is calculated as: (number of unemployed/number of employed) x 100.
   c. the number unemployed includes discouraged workers.
   d. the number of unemployed includes people who are not employed and not actively looking for jobs.

5. If you are available for work and have looked for a job at some point during the previous twelve months, but have not actively looked during the previous four weeks, you are considered
   a. in the labor force, but structurally unemployed.
   b. not in the labor force.
   c. in the labor force, but frictionally unemployed.
   d. none of the above

6. Suppose that you are available for work but have not looked for a job for at least the last four weeks because you believe that no jobs are available. You would then be counted as
   a. part of the labor force.
   b. unemployed.
   c. a discouraged worker.
   d. underemployed.

7. At full employment
   a. cyclical unemployment is zero.
   b. frictional unemployment is zero.
   c. structural unemployment is zero.
   d. no one is unemployed.

8. In April 2007, the working-age population of the United States was
   a. 78.7 million.
   b. 152.6 million.
   c. 231.3 million.
   d. 303.7 million.

9. In April 2007, which of the following groups was smallest?
   a. the unemployed
   b. people who were not in the labor force and not available for work
   c. discouraged workers and those who were not working for other reasons
   d. the number of people in the labor force

10. Which of the following is the correct formula for calculating the *unemployment rate*?

   a. $\dfrac{\text{Number of unemployed}}{\text{Labor force}} \times 100$

   b. $\dfrac{\text{Labor force}}{\text{Working-age population}} \times 100$

   c. Both of the formulas above are used to calculate the unemployment rate.
   d. Neither of the formulas above are used to calculate the unemployment rate.

11. How would employment statistics be affected if they included people in the military?
   a. The unemployment rate would decrease.
   b. The working-age population would remain the same.
   c. The labor force participation rate would remain the same.
   d. all of the above

12. What would be the impact of counting as unemployed both discouraged workers and those who work part-time but would prefer to work full-time?
   a. The unemployment rate would remain the same because those people are already counted as unemployed.
   b. The unemployment rate would increase.
   c. The unemployment rate would decrease.
   d. The annual unemployment rate would have been close to 40% in the last decade.

13. Two important trends in the labor force participation rates of adults aged 20 and over in the United States since 1950 are the _____ labor force participation rate of adult women and the _____ labor force participation rate of adult men.
    a. falling; rising
    b. falling; falling
    c. rising; falling
    d. rising; rising

14. The ability of some men to survive without apparently ever holding a job
    a. has remained virtually the same since the 1960s.
    b. has all but disappeared in recent years.
    c. has been rising in recent years.
    d. is nearly impossible in today's society.

15. In April 2007, which of the following demographic groups had a higher rate of unemployment than the unemployment rate for the total population?
    a. white adults
    b. black adults
    c. Hispanic adults
    d. None of the above. The unemployment rates for these groups were all lower than the overall unemployment rate.

16. In the U.S. economy today, how long does the typical unemployed person stay unemployed?
    a. less than 5 weeks
    b. 5 to 14 weeks
    c. 15 to 26 weeks
    d. 27 weeks or more

17. Relative to the household survey, which of the following is a strength of the *establishment survey*?
    a. It provides better information on the number of persons self-employed than the household survey.
    b. It provides information on unemployment, which the household survey does not provide.
    c. It is determined by actual payrolls, rather than by the unverified answers of the household survey.
    d. all of the above

18. The extent of job creation and job destruction is
    a. a serious shortcoming of our economic system.
    b. what we would expect in a vibrant market system.
    c. an ideal feature of our economy, because very few jobs are ever destroyed while many new ones are created all the time.
    d. the main reason why the U.S. unemployment rate is persistently high.

19. From 1950 until 2007, the behavior of the annual unemployment rate in the United States demonstrated that
    a. the unemployment rate rises during both recessions and expansions.
    b. the unemployment rate falls during both recessions and expansions.
    c. the unemployment rate falls during recessions and rises during expansions.
    d. the unemployment rate rises during recessions and falls during expansions.

20. The short-term unemployment that arises from the process of matching workers with jobs is called
    a. frictional unemployment.
    b. structural unemployment.
    c. cyclical unemployment.
    d. seasonal unemployment.

21. Unemployment arising from a persistent mismatch between the skills and characteristics of workers and the requirements of jobs is called
    a. frictional unemployment.
    b. structural unemployment.
    c. cyclical unemployment.
    d. seasonal unemployment.

22. When the economy is at *full employment*, which types of unemployment remain?
    a. cyclical and structural
    b. frictional and structural
    c. frictional and cyclical
    d. None of the above. Full employment means that there is no unemployment, so the unemployment rate would be zero.

23. The "normal" underlying level of unemployment in the economy is
    a. the sum of structural unemployment and frictional unemployment.
    b. the full-employment rate of unemployment.
    c. the natural rate of unemployment.
    d. all of the above

24. Government policies can help to reduce the levels of frictional and structural unemployment, but they can also help to increase them. Which of the following policies can cause an increase in the levels of frictional or structural unemployment?
    a. increasing the length of time that the unemployed can receive payments from the government
    b. passing legislation that makes it more difficult for firms to fire workers
    c. increasing the minimum wage
    d. all of the above

25. Increases in the minimum wage will
    a. increase unemployment among workers whose market wage is higher than the new minimum wage.
    b. increase teenage unemployment.
    c. increase the level of unemployment for all groups of workers.
    d. have a large effect on the unemployment rate in the United States.

26. Which of the following is the prevailing view of economists about the unemployment insurance program in the United States?
    a. Unemployment insurance is a bad idea because the unemployed spend more time searching for jobs after they receive these payments.
    b. Unemployment insurance is a bad idea because it promotes laziness among the unemployed.
    c. Unemployment insurance is a good idea because it helps the unemployed maintain their income and spending, which helps reduce the severity of recessions.
    d. Most economists are against unemployment insurance but they don't explain why.

27. The unemployment rate in the United States is usually _____ than the unemployment rates in most other high-income countries, partly because the United States has _____ requirements for the unemployed to receive government payments.
    a. higher; less stringent
    b. higher; more stringent
    c. lower; less stringent
    d. lower; more stringent

28. If the minimum wage is set above the market-determined clearing wage
    a. the quantity of labor demanded will be greater than the quantity of labor supplied.
    b. the unemployment rate will be higher than it would be without a minimum wage.
    c. the minimum wage generates a shortage of unskilled workers.
    d. all of the above

29. A wage higher than the market wage paid by a firm in order to increase worker productivity is
    a. the idea behind the minimum wage.
    b. a burden on production costs and profits.
    c. an efficiency wage.
    d. a compensating differential.

30. To obtain prices of a representative group of goods and services, the Bureau of Labor Statistics (BLS) conducts a monthly survey of _____ households nationwide on their spending habits. The results of this survey are used to construct a market basket of _____ goods and services purchased by the typical urban family of four.
    a. 1,000; 80,000
    b. 10,000; 525
    c. 30,000; 211
    d. 5,000; 75

31. In calculating the CPI
    a. the largest group of items in the market basket is Food and Beverages.
    b. the BLS varies the quantity of a good in the market basket in response to changes in current sales of the good.
    c. the market basket of goods and services is updated monthly.
    d. the market basket does not include large equipment purchased by business firms.

32. Of the eight categories in the CPI market basket, which three categories make up more than 75 percent of the basket?
    a. medical care, recreation, and education
    b. food and beverages, apparel, and other goods and services
    c. housing, transportation, and food
    d. None of the above. Each category in the basket comprises the same percentage of the basket as the others.

33. Computation of the CPI assumes that households buy the same market basket of products each month. For this reason, one of the following is irrelevant in calculating the CPI. Which one?
    a. the prices of the products purchased in the base year
    b. the prices of the products purchased in the current year
    c. the quantities of the products purchased in the base year
    d. the quantities of the products purchased in the current year

34. If the CPI in 2002 was 180 and the CPI in 2003 was 184, what was the inflation rate between 2002 and 2003?
    a. 4%
    b. 2.22%
    c. 2.17%
    d. 97.8%

35. Changes in the CPI overstate the true inflation rate due to four "biases." If apple prices rise rapidly during the month while orange prices fall, consumers will reduce their apple purchases and increase their orange purchases. Which of the four biases is concerned with this tendency?
    a. the substitution bias
    b. the increase in quality bias
    c. the new product bias
    d. the outlet bias

36. Which of the following is a better measure of the average prices of all goods and services included in GDP?
    a. the consumer price index
    b. the producer price index
    c. the GDP deflator
    d. the inflation rate

37. If nominal GDP in a given year is $11,000 billion and real GDP is $10,000 billion, then the GDP price deflator in that year equals
    a. 1.1%.
    b. 110.
    c. 10%.
    d. 0.90, or 90%.

38. If the inflation rate is 4 percent and the nominal interest rate is 6 percent, then the real interest rate is
    a. 10 percent, which is the sum of the nominal interest rate and the inflation rate.
    b. 2 percent, which is the difference between the nominal interest rate and the inflation rate.
    c. 1.5 percent, which is the ratio of the nominal interest rate to the inflation rate.
    d. 6 percent, which is the same as the nominal interest rate.

39. The inflation rate is
    a. the percentage change in nominal GDP from one year to the next.
    b. the percentage change in real GDP from one year to the next.
    c. the percentage difference between nominal GDP and real GDP in any given year.
    d. the percentage change in the GDP deflator from one year to the next.

40. Which market basket below specifically targets *intermediate goods*?
    a. the basket used by the consumer price index
    b. the basket used by the GDP deflator
    c. the basket used by the producer price index
    d. all of the above

41. If the consumer price index was 80 in 1979 and 160 in 1999, then average prices in 1999 were
    a.   half of what they were in 1979.
    b.   twice as high in 1999 as in 1979.
    c.   80 times higher than in 1979.
    d.   the same as they were in 1979 in real terms.

42. If the CPI was 190 in 2004 and 185 in 2003, what pay raise would someone who earned $40,000 income in 2003 have to earn in order to keep her purchasing power constant?
    a. $1,052
    b. $1,081
    c. $2,000
    d.   none of the above

43. Economic variables that are calculated in current year prices are referred to as _____ variables, while variables that have been corrected to account for the effects of inflation are _____ variables.
    a.   nominal; real
    b.   real; nominal
    c.   updated; deflated
    d.   deflated; updated

44. The stated interest rate on a loan is
    a.   the nominal interest rate.
    b.   the real interest rate.
    c.   the rate of inflation.
    d.   the credit rate.

45. The real interest rate equals
    a.   the inflation rate minus the nominal interest rate.
    b.   the nominal interest rate minus the inflation rate.
    c.   the nominal interest rate plus the inflation rate.
    d.   the nominal interest rate divided by the CPI for a given year.

Short Answer Questions

1.   Suppose that the working age population of a country is 500. Currently 300 are in the labor force. In addition, 275 people are currently employed. For this country, what are the labor force participation rate and the unemployment rate?

   _____

   _____

   _____

   _____

2. Suppose that because of improvements in health care, people postpone their retirement and continue working until they are 68 instead of 63. How would this influence the labor force participation rate?

   _____

   _____

3. Why would we expect there to be some frictional and structural unemployment but no cyclical unemployment at full employment?

   _____

   _____

4. Suppose that to calculate the CPI we use three goods: coffee, tea, and diet cola. A typical consumer buys 2 pounds of coffee, 3 boxes of tea, and 1 can of diet cola. Prices of these goods are given in the table below for each of three years:

Year	Price of Coffee	Price of Tea	Price of Diet Cola	Value of Market Basket	CPI	CPI Inflation Rate
1	$3.25	$2.00	$1.10			
2	$3.75	$2.22	$1.20			
3	$4.05	$2.50	$1.25			

   Assume year 1 is the base year. Calculate the value of the market basket for each year. Remember the market basket of goods is the same from year to year. Then calculate the CPI and the CPI inflation rate. How would your answer differ if year 3 were the base year? (Remember, as with the CPI, use the same market basket of goods for each time period.)

   _____

   _____

   _____

   _____

5. Joe borrowed $300 from his friend Mike to buy a $300 bike. Joe agreed to pay Mike a 5% interest rate to compensate him for not having use of his $300 for that year and to adjust for the 2% inflation in the past. That nominal interest rate would imply a 3% real interest rate on the loan. Suppose that over the year the inflation rate was 3%, rather than the 2% rate Joe and Mike had expected. Who gains and who loses? How would your answer differ if the actual inflation rate over the year was 1%?

   _____

   _____

   _____

6. Suppose an economy has a population of 5,000 people (ages 16 and up). Of that number, 2,000 people are not in the labor force, and 150 people are unemployed. Use these numbers to calculate the labor force participation rate and the unemployment rate.

_____

_____

_____

True/False Questions

T F 1. The unemployment rate is the percentage of the population that is unemployed.
T F 2. A discouraged worker is someone who has dropped out of the labor force because he believes there are no jobs available for him.
T F 3. Over the last 50 years, changes in the labor force participation rate of men and women have shown similar patterns.
T F 4. Teenage unemployment rates are about the same as adult unemployment rates.
T F 5. The household survey gives a higher total for people employed than the establishment survey because the household survey includes self-employment.
T F 6. Frictional unemployment includes people who quit their jobs to look for different jobs.
T F 7. Structural unemployment includes people who lost jobs because their job skills were no longer needed by their employer.
T F 8. Cyclical unemployment is caused by firms reducing employment due to decreased demand for their products during a recession.
T F 9. At full employment, the unemployment rate will be zero.
T F 10. The CPI is the average price of all goods and services in the economy.
T F 11. The market basket for the CPI changes every month.
T F 12. The CPI in 2004 is 189. This indicates that prices have increased 89% from the base year.
T F 13. The GDP deflator is defined as the ratio of nominal GDP to real GDP multiplied by 100.
T F 14. The real interest rate is the nominal interest rate plus the inflation rate.
T F 15. If inflation is unexpectedly high, this will benefit borrowers more than lenders.

Answers to the Self-Test

Multiple-Choice Questions

Question	Answer	Comment
1	c	In the 1960s, Arthur Okun, who was chairman of the Council of Economic Advisers during Lyndon Johnson's administration, coined the term "misery index," which adds together the inflation rate and the unemployment rate to give a rough measure of the state of the economy.
2	c	The Current Population Survey, often referred to as the household survey, is a sample of 60,000 households, chosen to represent the U.S. population, and asks about the employment status of everyone in the household 16 years of age or older.
3	a	The labor force is the sum of the employed and the unemployed.

4   a   The unemployment rate is the ratio of the number of people unemployed to the labor force, where the labor force is the sum of the employed and the unemployed. People are counted as unemployed if they are without a job, but are actively seeking a new job.

5   b   People who are available for work and who have actively looked for a job at some point during the previous twelve months, but who have not looked during the previous four weeks, are not in the labor force.

6   c   Discouraged workers are available for work, but have not looked for a job during the previous four weeks, because they believe no jobs are available for them.

7   a   Frictional and structural unemployment will exist at full employment. At full employment there is no unemployment due to the business cycle, or, in other words, no cyclical unemployment.

8   c   In April 2007, the working-age population of the United States was 231.3 million. The working-age population is divided into those in the labor force (152.6 million) and those not in the labor force (78.7 million).

9   c   The smallest group consisted of people who could possibly work but were not in the labor force, such as discouraged workers (400 thousand) and those not working for other reasons (1.0 million).

10   a   The unemployment rate measures the percentage of the labor force that is unemployed.

11   a   Including people in the military would increase the number of people counted as being in the labor force, but would leave unchanged the number of people counted as unemployed. Therefore, the unemployment rate would decrease.

12   b   For example, in April 2007, if the BLS counted as unemployed all the people who were available for work but not actively looking for a job, and all the people who were in part-time jobs but wanted full-time jobs, the unemployment rate would have increased from 4.5 percent to 8.2 percent.

13   c   Figure 8-2 highlights two important trends in labor force participation rates of adults aged 20 and over in the United States since 1950: the rising labor force participation rate of adult women and the falling labor force participation rate of adult men.

14   c   In recent years there has been an increase in the number of men who do not work and who are not receiving disability payments. In 1967, only 2.2 percent of men between the ages of 25 and 54 who were not in school did no paid work at all during the year. By 2006, 9.4 percent of men in this age category did not work.

15   b   Figure 8-3 shows that different groups in the population can have very different unemployment rates.

16   a   In April 2007, the percentage of total unemployed was as follows: less than 5 weeks: 35.6%; 5 to 14 weeks: 31.3%; 15 to 26 weeks: 15.7%, and 27 weeks or more: 17.5%.

17   c   The establishment survey has the strength of being determined by actual payrolls, rather than by unverified answers, as is the case with the household survey. In recent years, some economists have come to rely more on establishment survey data than on household survey data in analyzing current labor market conditions.

18	b	In 2005, for example, about 31.4 million jobs were created and about 29.4 million jobs were also destroyed. This degree of job creation and destruction is what we would expect in a vibrant market system where new firms are constantly being started, some existing firms are expanding, some existing firms are contracting, and some firms are going out of business.
19	d	Figure 8-4 illustrates that the unemployment rate follows the business cycle, rising during recessions and falling during expansions.
20	a	Frictional unemployment is the short-term unemployment that arises from the process of matching workers with jobs.
21	b	Structural unemployment arises from a persistent mismatch between the job skills or attributes of workers and the requirements of jobs.
22	b	When the only remaining unemployment is structural and frictional unemployment, the economy is said to be at full employment.
23	d	Economists often think of frictional and structural unemployment as being the "normal" underlying level of unemployment in the economy. This normal level of unemployment, which is the sum of frictional and structural unemployment, is referred to as the natural rate of unemployment. The natural rate of unemployment is also sometimes called the full-employment rate of unemployment.
24	d	Some government policies can add to the level of frictional and structural unemployment by either increasing the time workers devote to searching for jobs, by providing disincentives to firms to hire workers, or by keeping wages above their market level.
25	b	Increases in the minimum wage mostly affect teenage unemployment rates.
26	c	The unemployed spend more time searching for jobs because they receive these payments. This additional time spent searching raises the unemployment rate. Does this mean that the unemployment insurance program is a bad idea? Most economists would say no. Reduced spending contributes to the severity of recessions. Unemployment insurance helps the unemployed maintain their income and spending, which helps reduce the severity of recessions.
27	d	The unemployment rate in the United States is usually lower than the unemployment rates in most other high-income countries, partly because the United States has tougher requirements for the unemployed to receive government payments. This raises the costs of searching for a better job and lowers the unemployment rate.
28	b	If the minimum wage is set above the market wage determined by the demand and supply of labor, then the quantity of labor supplied will be greater than the quantity of labor demanded. As a result, the unemployment rate will be higher than it would be without a minimum wage.
29	c	An efficiency wage is a wage higher than the market wage paid by a firm in order to increase worker productivity. An efficiency wage also helps to retain and motivate workers.
30	c	To obtain prices of a representative group of goods and services, the Bureau of Labor Statistics (BLS) surveys 30,000 households nationwide on their spending habits. They use the results of this survey to construct a market basket of 211 goods and services purchased by the typical urban family of four.
31	d	In calculating the CPI, the market basket is updated only every few years.
32	c	Almost three-quarters of the market basket is in the categories of housing, transportation, and food.

33	d	The quantities of the products purchased in the current year are irrelevant in calculating the CPI because we are assuming that households buy the same market basket of products each month.
34	b	The CPI is computed as follows: [(184 – 180)/180] x 100 = 2.22%.
35	a	In constructing the CPI, the Bureau of Labor Statistics assumes that each month consumers purchase the same amount of each product in the market basket. In fact, consumers are likely to buy fewer of those products that increase most in price and more of those products that increase least in price.
36	c	The GDP deflator provides the broadest measure we have of the price level because it includes the price of every final good and service. It is an average of the prices of all goods and services included in GDP.
37	b	We can calculate the value of the GDP deflator for any year by dividing the value of nominal GDP for that year by the value of real GDP and multiplying by 100. In this case, ($11,000/$10,000) x 100 = 110.
38	b	The real interest rate is the nominal interest rate minus the inflation rate, or 6% − 4% = 2%.
39	d	We can calculate the inflation rate as the percentage change from one year to the next.
40	c	Like the consumer price index, the producer price index tracks the prices of a market basket of goods. But whereas the consumer price index tracks the prices of goods and services purchased by the typical household, the producer price index tracks the prices firms receive for goods and services at all stages of production.
41	b	On average, prices were twice as high in 1999 as in 1979, because 160/80 = 2.0.
42	b	Value in 2004 dollars = Value in 2003 dollars x (CPI in 2004/CPI in 2003). Then, 40,000 x (190/185) = 40,000 x 1.027 = $41,081. $41,081 − $40,000 = $1,081, the pay raise required.
43	a	Economic variables that are calculated in current year prices are referred to as nominal variables. When we are interested in tracking changes in an economic variable over time, rather than in seeing what its value would be in today's dollars, or to correct for the effects of inflation, we can divide the nominal variable by a price index and multiply by 100 to obtain a real variable.
44	a	The stated interest rate on a loan is the nominal interest rate. The real interest rate corrects the nominal interest rate for the impact of inflation.
45	b	The real interest rate corrects the nominal interest rate for the impact of inflation and is equal to the nominal interest rate minus the inflation rate.

Short Answer Responses

1. Using the equations:

$$\text{Labor force participation rate} = \frac{\text{Labor force}}{\text{Working-age population}} \times 100 = \left(\frac{300}{500}\right) \times 100 = 60.0\%$$

$$\text{Unemployment rate} = \frac{\text{Number of unemployed}}{\text{Labor force}} \times 100$$

$$= \left(\frac{300\text{-}275}{300}\right) \times 100 = 8.3\%$$

2. If workers stayed in the labor force longer, we would expect to see labor force levels increase. Given levels of the population, we would expect to see the labor force participation rate increase.

3. At full employment the economy cannot be in a recession. Therefore by definition there can be no cyclical unemployment. Frictional and structural unemployment are not due to the business cycle and can exist at any time, including at full employment.

4. With year 1 as the base year, the results are:

Year	Price of Coffee	Price of Tea	Price of Diet Coke	Value of Market Basket	CPI	CPI Inflation Rate
1	$3.25	$2.00	$1.10	$13.60	100.0	–
2	$3.75	$2.22	$1.20	$15.36	112.9	12.9%
3	$4.05	$2.50	$1.25	$16.85	123.9	9.7%

With year 3 as the base year, the results are:

Year	Price of Coffee	Price of Tea	Price of Diet Coke	Value of Market Basket	CPI	CPI Inflation Rate
1	$3.25	$2.00	$1.10	$13.60	80.7	–
2	$3.75	$2.22	$1.20	$15.36	91.2	12.9%
3	$4.05	$2.50	$1.25	$16.85	100.0	9.7%

Notice that the values for the CPI in each year are different, but the inflation rates are the same.

5. Joe and Mike agreed on a 5 percent interest rate, expecting 2 percent inflation. They implicitly agreed on a 3 percent real interest rate on the loan. If the actual inflation rate was 3 percent, the real interest rate on the loan would have been 2 percent. Mike's real return would be lower than he wanted. Mike loses. Joe, on the other hand, only pays a real cost of 2 percent instead of 3 percent. Joe gains from the higher inflation. If the inflation rate were 1 percent, the opposite would happen: Mike gains and Joe loses.

6. The labor force participation rate is the ratio of the number in the labor force to the working age population multiplied by 100. In this economy, the working age population is 5,000, and because 2,000 people are not in the labor force, the labor force will be 3,000 (= 5,000 − 2,000 = 3000), so the labor force participation rate is 60 percent = (100 x (3,000/5,000) = 60 percent). The unemployment rate is 100 multiplied by the percentage of the labor force that is unemployed, or 100 x (number unemployed/number in the labor force), so the unemployment rate is 5 percent (= 100 x (150/3,000) = 5.0 percent).

True/False Answers

1.	F	The unemployment rate is the percentage of the labor force that is unemployed.
2.	T	
3.	F	Female participation rates have risen while male rates have fallen.
4.	F	Teenage unemployment rates are much higher than adult rates.
5.	T	
6.	T	
7.	T	
8.	T	
9.	F	There will always be some structural and frictional unemployment. The natural rate of unemployment is always positive.
10.	F	The CPI includes only those goods that are in the BLS market basket.
11.	F	The market basket is updated every two years.
12.	T	
13.	T	
14.	F	The real interest rate equals the nominal interest rate minus the inflation rate.
15.	T	