1.The residents of a certain dormitory have collected the following data: people who live in the dorm can be classified as either involved in a relationship or uninvolved. Among involved people, 10 percent experience a breakup of their relationship every month. Among uninvolved people, 5 percent enter into a relationship every month. What is the steady-state fraction of residents who are uninvolved?

2. In this chapter we saw that the steady-state rate of unemployment is $U/L = s/(s + f)$. Suppose that the unemployment rate does not begin at this level. Show that unemployment will evolve over time and reach this steady state. (*Hint:* Express the change in the number of unemployed as a function of s, f, and U. Then show that if unemployment is above the natural rate, unemployment falls, and if unemployment is below the natural rate, unemployment rises.)

3. Suppose that Congress passes legislation making it more difficult for firms to fire workers. (An example is a law requiring severance pay for fired workers.) If this legislation reduces the rate of job separation without affecting the rate of job finding, how would the natural rate of unemployment change? Do you think it is plausible that the legislation would not affect the rate of job finding? Why or why not?

4. **Consider an economy with the following Cobb–Douglas production function:**

$Y = 5K^{1/3}L^{2/3}$

A. Derive the equation describing labor demand in this economy as a function of the real wage and the capital stock.

B. The economy has 27,000 units of capital
and a labor force of 1,000 workers. Assuming that factor prices adjust to equilibrate supply and demand, calculate the real wage, total output, and the total amount earned by workers.

C. Now suppose that Congress, concerned about the welfare of the working class, passes a law setting a minimum wage that is 10 percent above the equilibrium wage you derived
in part (b). Assuming that Congress cannot dictate how many workers are hired at the mandated wage, what are the effects of this law? Specifically, calculate what happens to the real wage, employment, output, and the total amount earned by workers.

D. Does Congress succeed in its goal of helping the working class? Explain.

E. Do you think that this analysis provides a good way of thinking about a minimum-wage law? Why or why not?

5. Suppose that a country experiences a reduction in productivity—that is, an adverse shock to the production function.

a. What happens to the labor demand curve?

b. How would this change in productivity affect the labor market—that is, employment, unemployment, and real wages—if the labor market is always in equilibrium?

c. How would this change in productivity affect the labor market if unions prevent real wages from falling?

6. Consider an economy with two sectors: manufacturing and services. Demand for labor in manufacturing and services are described by these equations:

L_{s}=100-4W_{s}

$L_m = 200 - 6W_m$

A. If workers are free to move between sectors, what relationship will there be between W_m and W_s ?

B. Suppose that the condition in part (a) holds and wages adjust to equilibrate labor supply and labor demand. Calculate the wage and employment in each sector.

C. Suppose a union establishes itself in manufacturing and pushes the manufacturing wage to $25. Calculate employment in manufacturing.

D. In the aftermath of the unionization of manufacturing, all workers who cannot get the highly paid union jobs move to the service sector. Calculate the wage and employment in services.

E. Now suppose that workers have a *reservation wage* of $15—that is, rather than taking a job at a wage below $15, they would rather wait for a $25 union job to open up. Calculate the wage and employment in each sector.What is the economy's unemployment rate?