while there are both income and substitution effects, it is likely that income effects will dominate and thus that some workers will enter the labor force or work more hours. For the middle income range, the net wage is equal to the market wage, so there is an income effect but not a substitution effect. Thus workers may actually work less. In the upper income range, the net wage is less than the market wage, as the credit is phased out. Thus the implicit reduction in the wage will create income and substitution effects, both of which will cause workers to supply less labor (because the opportunity cost of leisure has fallen while income has increased), and thus it is likely that workers at that income range will choose to work less.

### Review Questions

Choose the letter that represents the **BEST** response.

#### The Labor/Leisure Choice: The Fundamentals

1. Although firms have an important say in how many hours an employee works, workers can adjust their hours through
   a. choice of occupation.
   b. choice of full-time or part-time work.
   c. absenteeism.
   d. all of the above.

2. Indifference curves representing preferences for leisure and income should be drawn in such a way that they do not cross. If they do, it can be inferred that
   a. the steeper curve represents an individual who places a low value on an extra hour of leisure.
   b. the individual is inconsistent in his ranking of different income and leisure combinations.
   c. the indifference curves that cross pertain to different individuals.
   d. either b or c.

In answering Questions 3 and 4, please refer to Figure 6-4. The budget constraint is represented by line $abc$.

![Figure 6-4](image_url)

3. Which of the following is true in Figure 6-4?
   a. The wage rate is $4.
   b. Nonlabor income is $400.
   c. The optimal number of hours to supply is zero.
   d. All of the above.
4. The convex shape of the indifference curves in Figure 6-4 means that
   a. when leisure is low and income is high, additional units of leisure are very valuable.
   b. when leisure is high and income low, additional units of leisure are not very valuable.
   c. people generally prefer having some leisure and some income to having much income
      and little leisure, or much leisure and little income.
   d. all of the above.

5. The optimal level of leisure occurs where
   a. the level of leisure is maximized subject to the budget constraint.
   b. the level of income is maximized subject to the budget constraint.
   c. the highest attainable indifference curve is tangent to the budget constraint.
   d. both a and b.

6. An individual with standard downward-sloping indifference curves will participate in the labor
   market provided
   a. the indifference curves between leisure and income are steep.
   b. a tangency between the budget constraint and the indifference curve is reached.
   c. at the point where leisure is at its maximum, the indifference curve is steeper than the budget
      constraint.
   d. at the point where leisure is at its maximum, the indifference curve is flatter than the budget
      constraint.

In answering Questions 7 and 8, please refer to Figure 6-5. The budget constraint is given by
line abcd.

7. The shape of the indifference curves in Figure 6-5 means that
   a. after a certain number of leisure hours is reached, additional leisure hours become very
      valuable.
   b. after a certain number of leisure hours are reached, additional leisure hours have no value.
   c. after a certain number of leisure hours are reached, work hours are actually viewed as a good
      thing.
   d. as leisure hours increase, additional hours of leisure fall in value, but after some point, start to
      increase again.
8. Which of the following statements is consistent with Figure 6-5?
   a. The market wage rate is $6.
   b. Low-income individuals receive a subsidy of $400 and face an implicit tax rate of zero.
   c. The optimal number of hours to supply is 50.
   d. The optimal number of hours to supply is zero.

**Income and Substitution Effects**

9. If a person has preferences that lead to a choice of zero work hours, an increase in the wage rate will result in
   a. an income effect only.
   b. a substitution effect only.
   c. counteracting income and substitution effects.
   d. a dominant substitution effect.

10. Suppose leisure is an inferior good (a good whose consumption goes down as income goes up). As the wage rate goes up
    a. hours supplied should go up.
    b. hours supplied should go down.
    c. hours supplied go up provided the substitution effect dominates the income effect.
    d. hours supplied go up provided the income effect dominates the substitution effect.

11. A backward-bending labor supply curve occurs when
    a. leisure is a normal good and the substitution effect dominates at low wage levels.
    b. leisure is a normal good and the income effect dominates at high wage levels.
    c. at low wages level, leisure is a normal goods, but then is an inferior good at high wage levels.
    d. both a and b.

12. What should be the effect on labor supply of reducing marginal income tax rates while keeping the total taxes paid by a worker constant?
   a. Hours supplied should go up.
   b. Hours supplied will go down.
   c. Hours supplied stay the same.
   d. Hours supplied should go up if the substitution effect dominates the income effect.

**Basic Income Replacement and Income Maintenance Programs**

13. Suppose the government promises to pay workers who lose their sight in a workplace accident $100,000 regardless of their earnings before the accident. This payment would create
   a. a pure income effect.
   b. a pure substitution effect.
   c. reinforcing income and substitution effects.
   d. counteracting income and substitution effects.
14. An income replacement program based on scheduled benefits generally preserves work incentives better than one that guarantees replacement of the actual income loss because the scheduled benefits approach
   a. creates a pure substitution effect.
   b. does not alter the price of leisure.
   c. leads to a higher level of utility.
   d. overcompensates workers for their injuries.

In answering Questions 15–18, please refer to Figure 6-6. The original constraint is line $ab$. The constraint associated with the income maintenance program is line $acdb$.

15. The implicit tax rate ($t$) used in this income maintenance program is
   a. 1.
   b. 0.
   c. .4.
   d. .5.

16. The actual subsidy paid to the individual will be
   a. $100.
   b. $500.
   c. $600.
   d. $1,200.

17. The substitution effect associated with this income maintenance program is
   a. an increase of 47 leisure hours.
   b. an increase of 103 leisure hours.
   c. a decrease of 103 leisure hours.
   d. an increase of 150 leisure hours.

18. The income effect associated with this income maintenance program is
   a. a decrease of $100.
   b. an increase of 47 leisure hours.
   c. an increase of 103 leisure hours.
   d. an increase of leisure hours.
19. In the typical income maintenance program, the higher the implicit tax rate
   a. the higher the breakeven point.
   b. the lower the work incentive.
   c. the higher the cost of the program.
   d. all of the above.

20. The problem with reducing the implicit tax rate pertaining to the welfare program is that
   a. individuals well above the poverty level may receive benefits.
   b. the cost of the program increases.
   c. people will have less incentive to work.
   d. both a and b.

21. Under the Earned Income Tax Credit program, the theoretical effects on labor supply are ________
    for the lowest income recipients, and ________ for the highest income recipients.
   a. an increase; a decrease
   b. a decrease; an increase
   c. ambiguous; a decrease
   d. an increase; ambiguous

22. The Earned Income Tax Credit is now viewed by many as being the most effective way of raising
    the incomes of the working poor because
   a. it is much more closely targeted on the working poor than the minimum wage.
   b. the estimated impact on hours worked by the working poor is positive.
   c. since the subsidy comes through the tax system rather than through employers, there is no
      negative stigmatizing effect on recipients.
   d. all of the above.

Problems

The Labor/Leisure Choice: The Fundamentals

23. Suppose an individual’s preferences for leisure and income can be represented by a Cobb-Douglas
    utility function of the form

    \[ U = L^\alpha Y^\beta. \]

    Assume the analysis pertains to one day and the maximum time available is 16 hours.

23a. Plot the \( U = 1,000 \) indifference curve assuming \( \alpha = 1 \) and \( \beta = 1. \)

23b. Plot the \( U = 8,000 \) indifference curve assuming \( \alpha = 2 \) and \( \beta = 1. \)

23c. What effect does an increased appreciation for leisure time have on the slope of a typical
    indifference curve?

24. Suppose the analysis pertains to one month and the maximum time available is 400 hours.
24a. Plot the budget constraint facing an individual receiving $400 in nonlabor income and a wage of $5 per hour.

24b. On the same graph, plot the budget constraint facing an individual receiving $200 in nonlabor income and a wage of $7 per hour.

**Income and Substitution Effects**

25. Consider Figure 6-7, which depicts a wage decrease. The original constraint is line $abc$. The new constraint is line $abd$.

![Figure 6-7](image)

25a. By how much has the wage decreased?

25b. What is the income effect of the wage decrease? What is the substitution effect of the wage decrease?

25c. Find the coordinates of two points on this individual’s labor supply curve. Is the labor supply curve upward or downward sloping over the range of the wage change?

**Basic Income Replacement and Income Maintenance Programs**

26. Consider an individual with preferences given by the formula $U = LY$. Suppose the total time available per day is 16 hours, the wage rate is $5, and nonlabor income is zero.

26a. Calculate the optimal level of leisure and labor hours, and the resulting earnings and utility level.

26b. Suppose the person is injured on the job in such a way that he cannot work at all. Prove that a policy that compensates the worker for his lost income will increase his utility.

26c. Find the minimum percentage of income that could be replaced and just keep the worker at the same level of utility as before his injury. Do you see any problems with this analysis?
27. Consider an individual with preferences given by the formula \( U = LY \). Assume the going wage rate is \$4 per hour and that the maximum time available per month is 400 hours. Also assume initially that the person has no nonlabor income. Now suppose that a welfare program is developed that provides low-income individuals with a benefit of \$500 if they do not work at all. As the person earns income on his own, benefits are scaled back by the fraction \( t \) for every dollar earned.

27a. Find the change in hours supplied for each of the following implicit tax rates: \( t = 1 \), \( t = 0.5 \), \( t = 0 \).

27b. Which rate provides the least work disincentive? Explain why this happens.

28. Figure 6-8 shows two income maintenance programs that provide a maximum subsidy of \$350 to anyone who does not work at all. One program is represented by the constraint \( acdb \), while the other is represented by the constraint \( aceb \).

28a. What are the implicit tax rates associated with each program?

28b. Given the preferences depicted on the graph, which program provides the strongest work incentives? Explain the intuition behind your finding.

![Figure 6-8](image)

**A Variation on the Basic Income Maintenance Program**

29. Consider an individual with preferences for leisure and income given by the Cobb-Douglas utility function \( U = LY \). Suppose an income maintenance program is created where individuals who do not work receive \$2,000. Those who do work also receive the full subsidy provided they earn \$4,000 or less. Those earning above \$4,000 have their subsidy reduced by a dollar for every additional dollar earned beyond \$4,000. The maximum time available is 2,800 hours per year, and the going wage is \$5. The person initially has no nonlabor income.

29a. Graph the budget constraint facing a typical individual before the program is enacted. Then draw the constraint after the program is enacted. What is the breakeven point?

29b. Find the optimal number of hours before the adoption of the program. Calculate the level of utility the individual achieves.

29c. Using the graph as a guide, find the optimal number of hours after the program is enacted. Calculate the new level of utility. Would your answer have been different if all benefits were simply cut off once a person earned \$4,000?