1. The quantity of apples picked per hour is given below. All workers are of equal ability. The market for apples and apple pickers are both perfectly competitive. The price of apples is $5 a box.

<table>
<thead>
<tr>
<th>Number of Workers</th>
<th>Quantity of Apples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>39</td>
</tr>
<tr>
<td>4</td>
<td>47</td>
</tr>
<tr>
<td>5</td>
<td>52</td>
</tr>
</tbody>
</table>

![Demand Curve Diagram]

a. In the space to the right above, carefully plot the demand curve for apple pickers.
   LABEL AND NUMBER the axes.

b. How many workers will be hired at a wage rate of $41? (Assume no fractional workers.)

\[ MRP_L > 41 \text{ for } first 3 \]

1 1 1

1 1 1

c. How many workers will be hired at a wage rate of $37?

\[ MRP_L > 37 \text{ for first 4} \]

3 2

\[ q_d = \frac{4L}{24w} = \frac{1}{3} = \frac{372}{9.41} \approx -3.4 \]

1 1

d. Please calculate the elasticity of demand when the wage falls from $41 to $37.

e. Is the demand for apple picker labor elastic or inelastic?

f. We discussed four things that affect the elasticity of demand for labor. Discuss any one of these as a reason why the demand for apple picker labor was what you found in part e.

(A couple of sentences.)

- Large share of TC. Firms respond to an increase in wages heavily as very few substitute.
- Good substitute, exist. Apple pickers can be replaced by machines. Can also substitute may be demand for products elastic, good substitutes exist, others.

1 1

g. What is the actual elasticity of demand for labor in the United States? (Hammermesh's middle estimate.)

1 1

1 1

1 1 h. Currently there are about 145 million Americans who are employed. Using Hammermesh's estimate of elasticity, calculate the reduction in the number of people employed if wages were to rise by five percent. (I am looking for a number and not a percent as your answer.)

\[ \frac{dq}{dw} = -3 \Rightarrow \frac{24L}{4.12} = -5 \Rightarrow 1.5 \text{L} = 2.4 \text{M} \text{ilians} \]
2. a. Jerry is a man who currently makes $7.00 per hour. In the graph to the right, please draw his budget line. Assume he has no outside income.

b. How many hours does he work each week?

c. Draw his new budget line if he gets a raise and now makes $10.00 per hour.

d. How many hours a week does he now work?

e. In the graph to the right, draw his supply curve of labor. Carefully label and number the axes.

f. Which effect was larger here; the income or substitution? How can you tell?

g. How does the supply curve of labor you calculated compare with the changes that occurred in the American economy in the first part of the previous century? Explain.

h. Is leisure a normal good for Jerry? Demonstrate using the graph at the top of the page.
3. Tina can work up to 100 hours per week. She has $200 in non-employment income and can earn a wage of $6.00 per hour. Draw her budget line and label it AB.

b. Is she a member of the labor force? Please explain why or why not based on the graph.

2/2 No. She does not work and does not wish to.

c. Suppose Tina loses her non-employment income. Draw her budget line and label it CD.

d. Is she a member of the labor force now? Once again, Explain why or why not.

2/1 Yes, she wants to work 36 hours per week.

e. In this example, have we seen an income effect, substitution effect or both? How do we know?

3/2 A pure (only) income effect. Her wage rate did not change. She lost only income.

f. Was the change in the budget line from AB to CD the same as someone exhausting their TANF benefits? Explain.

3/2 The slope would change under TANF since the implicit tax rate reduces benefits with income.

g. Cite two differences between AFDC and TANF.

3/2 AFDC

- Time limit
- Must work or school req.
- No implicit tax rate

- TANF

- 5 year max
- Must work or school req.
- Lower tax on others, too
4. (6 points.) I gathered some data on males 35-44 in the United States who were born in Mexico. Using FERRETT I found

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>2,857,371</td>
</tr>
<tr>
<td>Employed-At Work</td>
<td>2,526,510</td>
</tr>
<tr>
<td>Employed-Absent</td>
<td>64,539</td>
</tr>
<tr>
<td>Unemployed-On Layoff</td>
<td>33,828</td>
</tr>
<tr>
<td>Unemployed-Looking</td>
<td>64,753</td>
</tr>
</tbody>
</table>

a. Calculate their unemployment rate.

\[
\text{Unemployment Rate} = \frac{33,828}{2,857,371} = 1.18% 
\]

b. Calculate their labor force participation rate.

\[
\text{Labor Force Participation Rate} = \frac{2,526,510 + 64,539}{2,857,371} = 91.12% 
\]

5. (8 points)

a. In the space below, draw the labor force participation rate of white women in the United States. You do not have to be exact.

[Diagram of labor force participation rate]

b. Is the labor force participation rate higher at age 65 or above or at age 35-44? Explain the economic reasons for this.

35-44. Retire and pension/soc sec at age 65+. Also, wages might be higher at 35-44.

Further lifecycle theory says people choose to work.

C. Which statement is most accurate? The labor force participation rate of women peaks at about (circle the best answer.)

90% 75% 50% 33% 10%
Multiple Choice. Two points each.

6. Which of the following is not unique to the labor market?
   a. labor is embodied in the seller.
   b. the relationship tends to be long term.
   c. labor tends to be homogenous.
   d. all are unique to labor.

7. Unions have been able to secure legislations that makes it hard to fire workers in Europe. This is an example of
   a. market forces
   b. institutional forces
   c. sociological forces
   d. an income effect.

8. Women have increased their labor force participation rate in recent years because of a greater acceptance of working women. This is an example of
   a. market forces
   b. institutional forces
   c. sociological forces
   d. an income effect.

9. Since 1950 in the United States there has been a relative:
   a. increase in the number of farm-related jobs.
   b. decrease in the number of service and blue-collar jobs.
   c. increase in the number of white-collar and blue-collar jobs.
   d. increase in the number of white-collar and service jobs.

10. Equilibrium hours of work occurs:
    a. at the point on the budget constraint where the wage rate equals the marginal rate of substitution.
    b. where the marginal rate of substitution is maximized.
    c. on the highest indifference curve, regardless of whether it is tangent to the budget line.
    d. at the point on an indifference curve where the additional utility of working one more hour is zero.

11. A rise in the marginal income tax rate will cause a person to:
    a. reduce work hours because of a negative income effect.
    b. increase work hours if the income effect is stronger than the substitution effect.
    c. leave work hours unchanged as he or she attempts to maintain the same standard of living.
    d. reduce work hours if the income effect is stronger than the substitution effect.
12. Europeans, on average
   a. work fewer hours than Americans in part due to their higher tax rates.
   b. work more hours than Americans to maintain their standard of living.
   c. work more hours than Americans as restrictions on hours worked have disappeared.
   d. have fewer vacation days than Americans.

13. Suppose Ruth must pay $5 per hour for baby-sitting when she works. This
   a. shifts the budget line counter clockwise.
   b. shifts the budget line clockwise.
   c. shifts the budget line parallel and down.
   d. shifts the budget line parallel and up.

14. In our SHAD exercise, we found the mean number of hours worked per week by American workers was
   a. About 40 hours
   b. About 35 hours
   c. About 30 hours
   d. About 60 hours

15. Which nation has the highest female labor force participation rate?
   a. France
   b. Germany
   c. Italy
   d. United States

16. The added worker effect is caused by:
   a. the decline in family income when the head of the family becomes unemployed.
   b. the increase in real wages over the 20th century.
   c. the poor job prospects facing the wife of an unemployed worker during a recession.
   d. the increase in the size and availability of disability benefits.

17. Only one of these people are unemployed. Which one?
   a. John who did not work for pay, but asked a friend about jobs.
   b. Paul who did not work for pay, but checked the want ads.
   c. George who worked for no pay for 20 hours at his family's restaurant.
   d. Ringo who had a job, but did not work as he was on strike.

18. Only one of these people is not employed. Which one?
   a. Mick had a job but did not work because he was on vacation.
   b. Keith had a job but did not work because he was ill.
   c. Brian had a job but did not work as he was on strike.
   d. Bill who had a job, but did not work as he was laid off.
19. On average, American women have how many children when they have completed their families?
   a. 1.1
   b. 1.6
   c. 2.1
   d. 3.3

20. In the United States children are
   a. an inferior good
   b. more costly to a rural family
   c. negative and inelastic with respect to a husband's wage rate
   d. negative and inelastic with respect to a wife's wage rate

21. Birth rates
   a. fall between the first and second stage of the economic transition
   b. fell in the U.S. between 1800 and 1900
   c. both a & b are true
   d. both a & b are false

22. In the area of diminishing returns in production:
   a. total output declines with each additional unit of labor input
   b. the marginal product of labor increases at a decreasing rate
   c. the marginal product of labor decreases
   d. the marginal product of labor first increases, then reaches a maximum level, and then decreases

23. The cyclical fluctuation in employment is greatest in:
   a. service industries
   b. durable manufacturing
   c. nondurable manufacturing
   d. government

24. An increase in the price of the product labor produces
   a. shift the labor demand curve to the left
   b. shift the labor demand to the right
   c. make the labor demand curve steeper
   d. cause a movement up the labor demand curve

25. Subsidizing the wages of workers of low skill workers is usually ineffective because
   a. many employers feel there is something wrong with a subsidized worker
   b. the demand for low skilled labor is inelastic
   c. both a & b are true
   d. both a & b are false
26. Cross-sectional data show that in the early 1990s:
   a. the labor force participation rate of white men was less than that of black men.
   b. the labor force participation rate of married men was less than that of single men.
   c. the labor force participation rate of white women was less than that of black women.
   d. all of the above.

27. Economic theory shows that improvement in technology will cause the long-run demand for
Labor in an industry to:
   a. increase or decrease.
   b. decrease.
   c. increase.
   d. remain the same.

28. In the period 1989-1996, which one of these industries was NOT a major contributor to
employment growth?
   a. Business services
   b. Retail Trade
   c. Durable goods manufacturing
   d. Health Care

29. Grilliches found
   a. Capital and skilled labor tend to be complements.
   b. Capital and skilled labor tend to be substitute.
   c. Capital and unskilled labor tend to be complements.
   d. Both b & c.

30. (Full credit to all answers)
   How many economists does it take to change a light bulb?
   a. None. If the bulb needed changing, the market would do it.
   b. It depends on the wage rate.
   c. Eight. One to change the light bulb and seven to hold all else constants.
   d. All of them as it will increase Aggregate Demand.