1. Let us suppose that Travis can work up to 100 hours a week. He can earn a wage of $7 per hour and he has no non-employment income. His indifference curves are given in the graph to the right.

   a. In the space provided please draw his budget line. Label it AB.

   b. How many hours will he work each week? 

   leisure 

   work (Labor)

   c. Suppose he gets an increase in his wage rate to $10 per hour. Draw his budget line and label it CD.

   d. How many hours will he work each week now?

   leisure 

   work (Labor)

   e. In the space to the right, please draw his supply curve of labor. Please carefully label and number the axis.

   f. Either with a formula or in words, explain what the income effect is. If you use a formula, define all terms.

   g. Either with a formula or in words, explain the substitution income effect is. If you use a formula, define all terms.

   h. In this example, which is larger? Explain how you can tell either graphically or with words.
2. Suppose we see the following relationship between labor and output for a firm. You may assume the amount of capital is fixed and the price of the product is $2.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
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<td>30</td>
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<td>6</td>
<td>174</td>
<td>29</td>
<td>24</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>7</td>
<td>182</td>
<td>26</td>
<td>8</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

a. Please fill in all of the blanks in the table above.

b. How many workers does the firm have to hire to produce 150 units of output?

\[ L = 5 \]

c. What wage would they have to pay them? Please explain how you derived this figure.

\[ MRP_L @ 5 = 68 \]

\[ \text{So what would be wage?} \]

d. In the graph to the right, please draw the firms demand curve for labor. Carefully label and number the axes.

e. Assume the wage rate was $15. How many workers would they hire? Why?

\[ \text{All seven, } MRP_L > 15 \]
3. In 2003 the average weekly earnings of truck drivers was $603 while the average weekly earnings of bank tellers was only $395. How might market, institutional and sociological forces respectively be responsible for the higher earnings of truck drivers? Please give an example of each (market, institutional and sociological forces) that might explain the difference.

Market forces (supply and demand) Perhaps the demand for truck drivers could be higher due to more skill being required, more dangerous or more physically demanding.

Institutional forces rely less on markets and rational actors. They see the importance of non-market forces such as unions. If more truck drivers belong to unions, perhaps their wages are higher. Also internal labor markets might exist where not all jobs are open to everyone. Perhaps you must start at the bottom and work your way up to truck driver.

Sociological forces are the influence of social groups. Maybe women are encouraged to become bank tellers rather than truck drivers and this increases the supply and reduces their wages. Perhaps women are more likely to be female and as a result discriminated against and face lower wages.
4. I have gathered data on female labor force participation from the SHAD assignment as well as added some from 1950. It is in the table below.

<table>
<thead>
<tr>
<th>Age</th>
<th>Female LFPR - 2004</th>
<th>Female LFPR 1950</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-34</td>
<td>74 %</td>
<td>34 %</td>
</tr>
<tr>
<td>35-44</td>
<td>75 %</td>
<td>39 %</td>
</tr>
<tr>
<td>45-54</td>
<td>76 %</td>
<td>38 %</td>
</tr>
<tr>
<td>55-64</td>
<td>56 %</td>
<td>27 %</td>
</tr>
<tr>
<td>65 and up</td>
<td>12 %</td>
<td>10 %</td>
</tr>
</tbody>
</table>

a. Please give three reasons from lecture or the text that might explain the change. Please explain each in a sentence or two.

- Rising wage rate of women - coupled with dominant substitution effect
- Declining fertility making it easier to enter the labor force
- Sociological reasons - less stigma for a woman to work
- Institutional - Anti - discrimination legislation has made it easier for women to find jobs
- A change in employment in different industries Increasing employment in service industries which tend to employ women
- Women's education levels have increased, which leads to higher wages eligible for jobs with better pay and status and more fringe benefits.

b. What is meant by the discouraged worker effect? How does it impact the labor force participation rate of women?

The discouraged worker effect is the decrease in labor force participation during an economic downturn. When the economy is doing poorly, women exit the labor force as they don't believe there are jobs to be found.

c. What is meant by the term reservation wage?

The reservation wage rate is the wage rate necessary to attract someone into the labor force.

d. Suppose the reservation wage has increased for women from 1950 to today. Please explain how the labor force participation rate may still have increased.

Even if the reservation wage has increased, the actual wage rate that women can earn has increased even more. Also, other factors may have changed.
5. Suppose the demand for dental hygienist’s labor is given below

<table>
<thead>
<tr>
<th>Wage</th>
<th>Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>300</td>
</tr>
<tr>
<td>10</td>
<td>270</td>
</tr>
</tbody>
</table>

a. Please calculate the elasticity of demand for labor as the wage rises from $8 to $10.

\[
\frac{\Delta Q}{Q_1} \cdot \frac{1}{\Delta P} = \frac{\frac{\Delta Q}{\Delta P}}{Q_1} = \frac{\frac{-30}{300}}{8} = -\frac{10}{25} = -0.4
\]

b. Based on the numbers above, is the demand for dental hygienist’s labor elastic or inelastic? How do you know?

Inelastic. The absolute value of the elasticity is less than one.

c. Cite four factors that influence the elasticity of demand for labor. Explain each in a few words.

- The elasticity of demand for the product makes (can you pass in wine) share of labor in total cost. If low, will absorb increasing availability of substitutes for labor if more or less inelastic cost of substitutes. If expensive, inelastic demand curve.

d. Please explain how at least two of the factors from part c would be consistent or inconsistent with the market for dental hygienists.

3/2 Answers will vary.

e. The text discusses why productivity might be expected to increase or decrease the demand for labor. In terms of the reasons discussed in the text, please explain why increases in the productivity of dental hygienists might reduce the demand for their labor.

3/2 There is a limited amount of dental with people need. If hygienists paid $1, might not need as many.
Numbers 6-25 are worth two points each. Answer all.

I gathered data on American Indian (Native American) males 25-54 from the March 2005 CPS. I found that:

- Total: 533
- Employed-at work: 392
- Employed-absent: 13
- On Layoff: 6
- No job Looking: 26
- Retired-Not in Labor Force: 3
- Disabled-Not in Labor force: 54
- Other-Not in Labor force: 42

(all numbers are in 1,000s)

6. Calculate the labor force participation rate of American Indian males 25-54.

\[
\frac{L}{P} = \frac{L_{15-54}}{P_{15-54}} = \frac{437}{533} = 81.5\%
\]

7. Please calculate their unemployment rate.

\[
\text{Unemployment Rate} = \frac{\text{Unem}}{L_{15-54}} = \frac{32}{437} = 7.3\%
\]

8. Suppose a state grants TANF benefits of $300 a month to a family that currently has no income. Suppose there is a $200 per month disregard and the implicit tax rate is 50%. What would their level of TANF benefits be if the parent took a job that paid $350 per month.

\[
\begin{align*}
\text{Current Income} & = 0 \\
\text{Disregard} & = 200 \\
\text{Job Income} & = 350 \\
\text{ Implicit Tax} & = 50\% \\
\text{Net Income} & = 250 \\
\text{TANF Benefits} & = 300 - 250 = 50
\end{align*}
\]

9. Approximately what percentage of American adults (age 16 and above) are in the labor force?

66%
Multiple Choice. Circle the best answer.

10. The job growth in the 1990s in the United States was found in five areas. Which of the following was not one of the five?

a. retailing  
   b. manufacturing  
   c. health care  
   d. business services

11. In terms of hours worked and wage rates, which effect is the largest?

a. the income effect for males  
   b. the substitution effect for males  
   c. the income effect for females  
   d. the substitution effect for females

12. Which of the following statement about hours worked is true?

a. Germans work on average fewer days per year than Americans.  
   b. Japanese work on average more hours per year than Americans.  
   c. The American work week has increased by five hours per week over the last 75 years.  
   d. All of the statements are true.

13. Which of the following statements about fertility is true?

a. American woman have on average approximately 1.3 births over their lifetime.  
   b. Husband's wage have no impact on wife's fertility in the United States.  
   c. Due to transportation, it is more expensive to have children on a farm  
   d. The cost of a child is higher when the mother's wage rate is higher.

14. The job security that Europeans enjoy

a. reduces employment rates  
   b. increases the elasticity of demand for labor  
   c. results in increased wage rates  
   d. results in a greater number of women being employed.

15. The labor force participation rate of American males

a. has increased since 1975 in response to higher wage rates for them  
   b. is higher for blacks than whites  
   c. has declined due to changes in disability and pensions  
   d. is lower for more educated males.
16. In general
   a. capital is a complement to labor
   b. capital is a substitute for both skilled and unskilled labor
   c. capital is a complement to unskilled labor and a substitute to skilled labor
   d. capital is a complement to skilled labor and a substitute to unskilled labor

17. The elasticity of demand for labor in the short run is approximately

18. The long term nature of the employment relationship
   a. leads to a multiplicity of individual labor markets
   b. makes the acquisition of information in the labor market more difficult
   c. encourages the development of a short-term employment relationship
   d. increases the importance that non-economic factors such as working conditions have on exchange in the labor market

19. If a worker is paid a fixed salary regardless of how many hours are worked
   a. the slope of the budget line is zero
   b. the slope of the budget line is one
   c. the slope of the budget constraint equals the income earned per hour
   d. the budget constraint lies to the left of the one for a hourly worker who earns the same amount per week as the salary worker.

20. Over the 20th century in the United States
   a. weekly hours of work declined, implying the substitution effect is greater than the income effect
   b. weekly hours of work declined, implying the income effect is greater than the substitution effect
   c. weekly hours of work increased, implying the substitution effect is greater than the income effect
   d. weekly hours of work increased, implying the income effect is greater than the substitution effect
21. If the cross-substitution effect is negative

a. the husband will work more if the wife’s nonlabor income increases, other things equal
b. the husband will work less if the wife’s nonlabor income increases, other things equal
c. the husband will work more if the wife’s wage rate increases, other things being equal
d. the husband will work less if the wife’s wage rate increases, other things being equal

22. 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.

23. 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

24. A wage subsidy program will result in a relatively larger increase in employment

a. the smaller the subsidy payment $S$
b. the smaller the subsidy rate $r$
c. the more elastic the demand curve
d. none of the above

25. An increase in labor productivity implies

a. a decrease in the long run demand for labor
b. more output is produced per unit of labor input
c. the long-run labor demand curve becomes more inelastic
d. the long-run labor demand curve becomes more elastic.