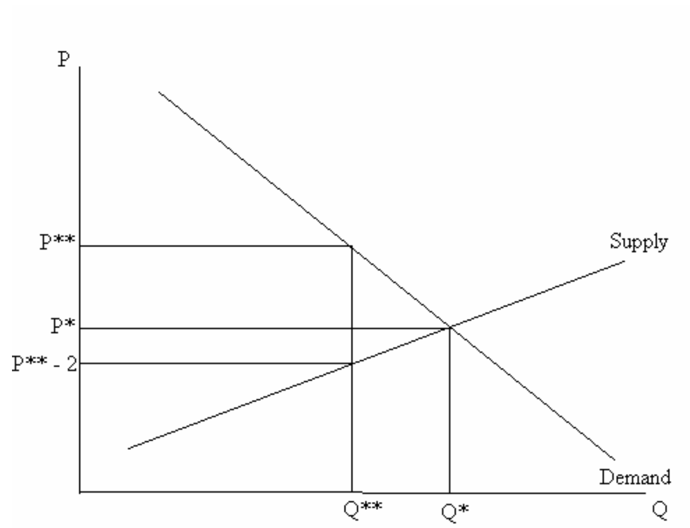
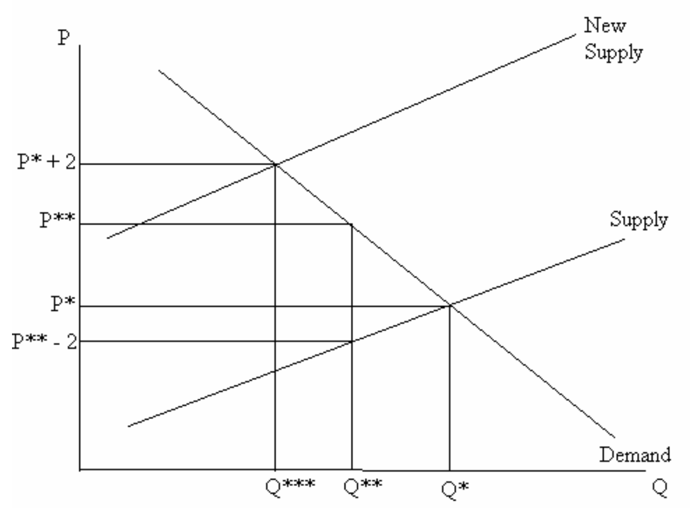
Micro Question 1

1. In the short run, a per-unit tax of $2 will create a wedge between supply and demand. Consumers pay P** while firms receive P**-2. The equilibrium quantity decreases from Q* to Q**. Because market demand is downward-sloping, the market price will increase by less than $2.



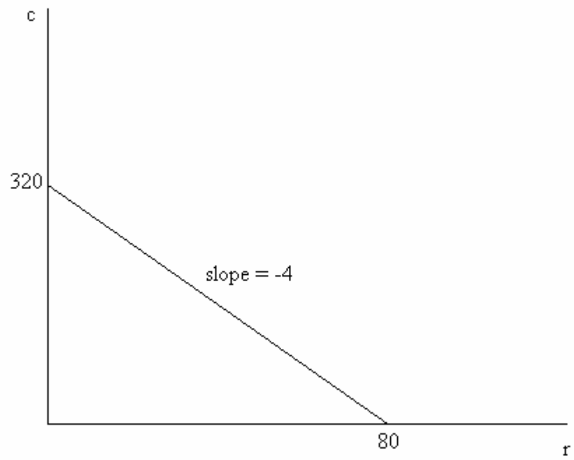
2. In the long run, some firms will exit the industry because profit is negative. As a result, market supply will decrease until firms make zero profit, or when P = MC. Because the per-unit tax does not change the firms' marginal cost, firms have to receive the pre-tax price P* to make zero profit. Hence, the tax burden has to be entirely bore by the consumers. The new equilibrium price is exactly $2 more than the pre-tax price.



3. The number of firms will decrease, and each of the remaining firms will produce the exact same quantity as before the per-unit tax was imposed.

Micro Question 2

1. The budget constraint is 320 = 4r + c because 4 × (80 - r) = c.

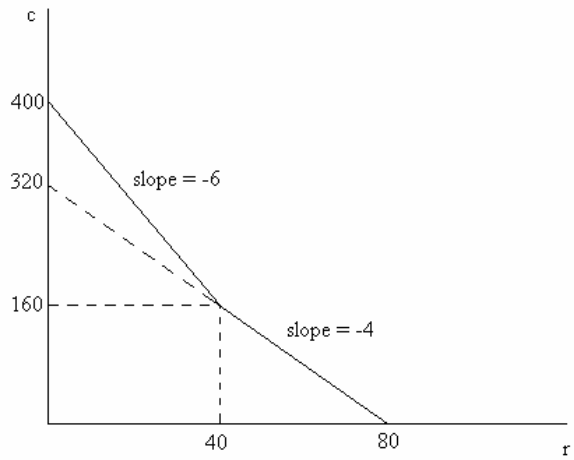


2. With Cobb-Douglas utility, the optimal choice satisfies the following equation:

$$\frac{c}{r} = 4$$

Hence, optimal choice is {c = 160, r = 40}. She will work 40 hours.

3.



4. If she works overtime, her budget constraint becomes 160 + 6 × (40 - r) = c and her optimal choice has to satisfy $\frac{c}{r} = 6$. The solution is $\left\{c = 200, r = 33\frac{1}{3}\right\}$. She will work $6\frac{2}{3}$ hours of overtime.

Micro Question 3

1. v is the amount a consumer is willing to pay for one pair of galoshes.

2. If a pair of galoshes is a good, galoshes-owners have higher level of utility. Thus, v is weakly positive.

3. The market demand is

$$Q = \begin{cases} 0 & P > A + B \\ \dfrac{A + B - P}{2B} & A - B \le P \le A + B. \\ 1 & P < A - B \end{cases}$$

4. The producer maximizes profit: $p = (A + B - 2BQ)Q - cQ^2$

   The solution is $Q^* = \dfrac{A+B}{4B+2c}$.

   The price is $P^* = A + B - 2B\left(\dfrac{A+B}{4B+2c}\right)$.

5. With N individual producers, the market price is given by $A + B - 2BNQ$.

   Solving the profit maximization problem, each firm produces $Q^* = \dfrac{A+B}{4BN+2c}$.

   The equilibrium market price is $P^* = A + B - 2BN\left(\dfrac{A+B}{4BN+2c}\right)$.

6. The industry supply is

$$Q = \begin{cases} 0 & P < K - J \\ \dfrac{P - K + J}{2J} & K - J \le P \le K + J . \\ 1 & P > K + J \end{cases}$$

7. Supply is equal to demand:

$$\frac{P - K + J}{2J} = \frac{A + B - P}{2B}$$

$$P^* = \frac{JA + JB + BK \_ BJ}{B + J}$$

$$Q^* = \frac{1}{2J}\left(\frac{JA + JB + BK \_ BJ}{B + J} - K + J\right)$$

Micro Question 4

1. Let X_{JOHN} be John's strategy set. Each element of X_{JOHN} is indexed by x_i, which denotes a strategy that accepts any offer that is at least as high as $i \in [0,10]$ and rejects otherwise.

Let Y_{JIM} be Jim's strategy set. Each element of Y_{JIM} is indexed by y_i, where $i \in [0,10]$ is the amount that Jim offers John.

The set of Nash equilibria consists of all pairs (x_i, y_i), $i \in [0,10]$.

2. Since Jim knows that John will accept any offer, the subgame perfect equilibrium is (x_0, y_0).

3. Because Z > 10, John rejects any offer below the cutoff. The subgame perfect equilibrium is (x_K, y_K). John will receive K. Thus, his total welfare increases as K increases.

4. If 10 > Z > K, the subgame perfect equilibrium is (x_K, y_K).
If 10 > K > Z, the subgame perfect equilibrium is (x_Z, y_Z).