

2. (10 points) Referring to our Garment example, suppose there are 3 companies. The first company needs to sew 100,000 buttons, the second company needs to sew 10,000 buttons, the third company needs to sew 1,000 buttons. Suppose buttons are sold in a competitive market at price = mc = 5 cents each. Suppose the labor cost of sewing 1 button is 1 cent each. If a sewing machine can replace labor, answer the following questions:

2.1 How much would each company be willing to pay for a sewing machine?

company 1: $100,000 \times 0.01 \text{ USD} = 1,000 \text{ USD}$

company 2: $10,000 \times 0.01 \text{ USD} = 100 \text{ USD}$

company 3: $1,000 \times 0.01 \text{ USD} = 10 \text{ USD}$

2.2 Suppose the sewing machine monopoly can do requirement tie-in and sell buttons along with its machine, what should be the price of each sewing machine and the price of each button for the sewing machine monopoly to extract all the willingness to pay from each garment company?

price of each sewing machine = 0 (give the machine for free)
 price / button = 5 cents + 1 cent = 6 cents. The machine monopoly buys buttons at 5 cents each in a competitive market. Then, it sells buttons to the garment companies at 6 cents each. The companies would now be indifferent between using machine & using labor to sew their buttons. Assuming that they choose to use sewing machine, their consumer surplus will be extracted entirely by the sewing machine monopoly.

2.3 If the cost of producing 1 sewing machine is 50 dollars, what should be the price of each sewing machine and the price of each button for the sewing machine monopoly to maximize its profit? How many companies will buy this machine?

• Since only company 1 & 2's willingness to pay exceeds cost of producing a machine, the machine monopoly will only consider to sell to these two potential customers. Here, if we use the same pricing strategy as in part 2.2, the maximum consumer surplus will be extracted (Free machine + 6 cents / button)

The machine monopoly's profit = Total Revenue - Total cost
 $= (1,000 + 100) - (50 \times 2)$
 Other $= 1100 - 100 = 1000 \text{ USD}$

* notes * Any mechanism that yields the same profit would also be given full marks.