Do **all 5** questions. All count equally

1. What are **all** the allocations on the contract curve for the following 2–person 2–good exchange economy?

Person 1's preferences can be represented by the utility function

$$u(x_1, y_1) = \sqrt{x_1} + 2\sqrt{y_1}$$

Person 2's preferences can be represented by the utility function

$$U(x_2, y_2) = 2\sqrt{x_2} + \sqrt{y_2}$$

The economy's total endowment of good X is 120, and the economy's total endowment of good Y is 60.

2. Suppose that a country contains N people, each of whom supplies (inelastically) the same amount of labour. There are many firms in the country, each of which has the same production function

$$y = 2\sqrt{nk}$$

where y is the quantity of cloth produced by the firm, n is the number of workers hired by the firm, and k is the amount of cotton used by the firm.

Firms sell cloth at a price of \$1 per metre ; this price is determined on world markets, and is not influenced by the country (which is very small).

The market for labour in the country is perfectly competitive, since there are many firms, and many workers.

All cotton is imported. The world price of cotton, r per tonne, is not influenced by the country (which is small).

The country's government can levy a tax t per tonne on firms' employment of cotton.

How does the wage earned by workers vary with the tax on cotton?

3. In the country described in question #2 above, suppose that the country distributes all its revenue from taxation of foreign cotton equally to each worker. (If the tax is negative – that is, if cotton use is subsidized — then the cost of the subsidy is spread equally over all workers.)

What cotton tax is best for the workers?

over

4. What is the incidence of a 100% tax (calculated as a percentage of the net [before–tax] price) on haircuts, if the market for haircuts is perfectly competitive, if the supply curve in the market has the equation

$$Q^s = (p_s)^3$$

and the demand curve has the equation

$$Q^D = \frac{1}{(P_D)^2}$$

where p_s is the price received by sellers, P^D is the price paid by buyers, Q^s is the quantity supplied, and Q^D is the quantity demanded?

5. What would be the incidence of a $1 tax on a good, if the good was sold by a Bertrand duopoly, if the cost of production of both firms in the duopoly were

$$TC(q) = 12q$$

(where $TC(q)$ is the total cost of producing q units of the good), and if aggregate demand for the good obeyed the equation

$$Q^d = 800 - 50P^D$$

(where Q^d is the quantity demanded, and P^D is the [tax–included] price paid by consumers)?

[Recall : In a Bertrand duopoly, two firms each choose their price simultaneously, and non–cooperatively. Buyers buy from the lower–priced firm ; if firms charge the same price, they each get half the aggregate demand.]