

*Time: 30 minutes. You may use a calculator if you wish, but you probably don't really need it. This problem is easier than it seems.*

Assume that there are two countries, the USA and China, each producing only two products, brand-name manufactures (X) and generic manufactures (Y) with the single input of labor under constant returns to scale and perfect competition. The USA has 200 million workers, while China has 1,000 million (i.e., a billion) workers. Let us measure one unit of X as the amount that can be produced by one million Chinese workers, and ditto for Y (this means that  $a_{LX}^* = a_{LY}^* = 1,000,000$ ). Assume workers in the USA are twenty times as productive as Chinese workers in producing X and ten times as productive in Y.

- a) On two separate diagrams, graph the Production Possibilities Frontier (PPF) for each country, with X on the horizontal axis, and solve for the autarky relative prices ( $RP = P_X/P_Y$ ). Express each PPF as an equation in slope-intercept form.
- b) Which country has higher wages, and why? Which country has the absolute advantage in each good? Which country has the comparative advantage in which good? What does the Ricardian Theorem predict?

Suppose that preferences are identical, and that each country always spends three-fourths of its income on X and the other one-fourth on Y. This implies that  $RQ^D = 3/RP$ , where  $RQ^D = Q_X/Q_Y$ .

- c) Under autarky, each country's consumption possibilities frontier (CPF) is identical to its PPF. Using the equations from (a), find the autarky quantities ( $Q_X$  and  $Q_Y$ ) for each country, and show the autarky points on your diagrams in (a).
- d) For the two countries together, what is the total production of X and of Y under autarky? What is the total production of each if both countries fully specialize according to their comparative advantage? What can you say about the effects of specialization?
- e) Graph relative supply and demand for the two countries together under free trade, and solve for the equilibrium RP and RQ under free trade. Show the resulting CPFs on your diagrams in (a). *Note: Showing the new consumption quantities for each country is not necessary, but will earn you a small bonus.*

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