

Time: 30 minutes. You may use a calculator if you wish.

Assume that Germany has 60 million identical workers, each of whom can produce either processed food products (Q_F) or machine tools (Q_M) under conditions of constant costs (i.e., constant returns to scale, with labor the only factor). It takes three German workers to produce one unit of processed food products, and two German workers to produce one unit of machine tools. France has 48 million workers, and it takes two French workers to produce one unit of Q_F and three French workers to produce one unit of Q_M .

- a) Putting Q_F on the horizontal axis, draw and label the PPFs for both Germany and France. What is the marginal rate of transformation ($MRT = MC_F/MC_M$) for each country?
- b) Suppose that both countries are autarkies. Using indifference curves but no numbers (yet), show how you find their choices for their production and consumption combinations, and their autarky price ratios (P_F/P_M).
- c) Assume these two countries have identical preferences, and consumers prefer to spend half of their income on each product. Relative Demand (RD) can therefore be written as $RQ = 1/RP$, where $RQ = (Q_F/Q_M)$ and $RP = (P_F/P_M)$. So, solve for the autarky values of Q_F and Q_M .
- d) Which country has the absolute advantage in each good? Which has the comparative advantage in each?
- e) Suppose that these countries are the only two countries in the world, and they suddenly create a new free trade area. What does the Ricardian model predict for the patterns of trade?
- f) Show the RS/RD graph for these two countries in free trade. Solve for the equilibrium RP (i.e., the terms of trade). For bonus points, solve for each country's new consumption bundles of Q_F and Q_M .
- g) Assuming both countries fully specialize, show the free trade equilibrium (i.e., the production and consumption choices) for both countries using the PPFs, the CPFs (i.e., the terms of trade or isovalue lines) and indifference curves. (You can show this on your graph for (b) if you want.)
- h) Finally, with Q_F on the horizontal axis and Q_M on the vertical axis, use the Edgeworth distribution box to illustrate how specialization increases total production of X and Y, and with indifference curves show how exchange from the point of full specialization allows both countries to reach a Pareto improvement in their utility.