Problem 1
Graphical analysis of gains from trade

(See Chapter 5, problem 1. For the 9th edition, go to Chapter 6, problem 1)
Assume Norway and Sweden trade with each other, with Norway exporting fish to Sweden, and Sweden exporting Volvos to Norway. Illustrate the gains from trade between the two countries using the standard trade model, assuming first that tastes for the goods are the same in both countries, but the PPF differ: Norway has a long coast that borders on the north Atlantic, making it relatively more productive in fishing. Sweden has a greater endowment of capital, making it relatively more productive in automobiles.

without trade

Swedish consumers consume
OA1 Volvo, OB1 fish;

with trade

Swedish consumers are better off at higher indifference curve (C1→C2).

Sweden exports A2A2' units of Volvo, imports B2B2' fish
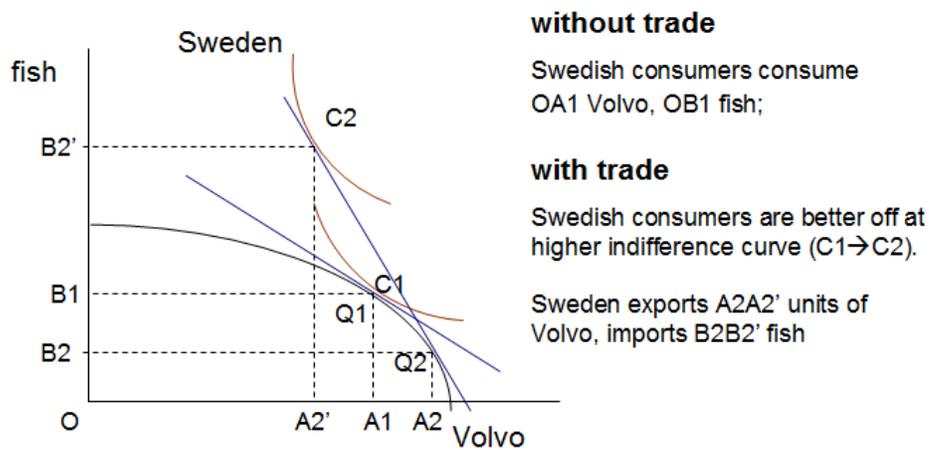
The following simple graphs would also suffice:
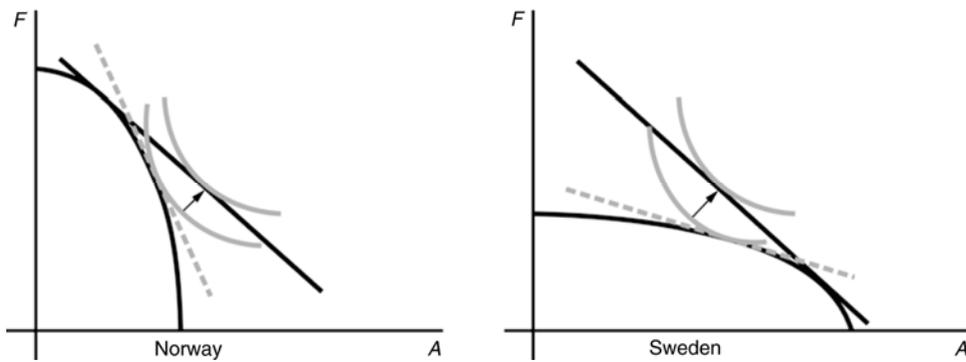
Note how welfare in both countries increases as the two countries move from production patterns governed by domestic prices (dashed line) to production patterns governed by world prices (straight line).

Problem 2
Change of factor endowments and terms of trade

(See Chapter 5, problem 7. For the 9th edition, go to Chapter 6, problem 7)
Two countries, A and B with same technology. Two factors, capital and labor. Two goods, X and Y, and X is capital-intensive. A is capital abundant. Analyze the welfare of the two countries.

First, Heckscher-Ohlin theory predicts an economy will export that good which uses intensively the factor which that economy has in relative abundance. Therefore, country A exports good X to country B and imports good Y.

An increase in the capital stock of either country favors production of good X, while an increase in the labor supply favors production of good Y.

With above in mind, also note that TOT=P_{EX}/P_{IM}, then

  a) An increase of A's capital stock

  A's TOT worsens, A's welfare may increase (less likely to decrease), and B's welfare increases.

  b) An increase of A's labor supply

  A's TOT improves, A's welfare increases and B's welfare decreases.

  c) An increase of B's capital stock

  B's TOT improves, B's welfare increases and A's welfare decreases.

  d) An increase of B's labor supply

  B's TOT worsens, B's welfare may increase (less likely to decrease), and A's welfare increases.

Problem 3
Trade model with imperfect competition

See Chapter 6, problem 5. For the 9th edition, go to Chapter 8, problem 3.

Essentially you need to solve the equilibrium of the following two equations:
(1) $AC = n * F/S + c$
(2) $P = c + 1/(b * n)$

Equation (2) is already given as in $P = 17,000 + (150/n)$, so $c = 17,000$, and $1/b = 150$.

Fixed cost, F, is also given and it equals to $5 billion. So what is S? Without trade, the size of the market for the US, $S_{US} = 300$ million, and the size of European market, $S_{EU} = 533$ million.

a) To solve for n_{us}, we have $n_{us} * F/S_{US} + c = c + 1/b * 1/n$, plug in all the numbers, we have: n_{us} x 5,000m/300m $= 150/n_{us}$ so $n_{us} = 3$.
Similarly, to solve for n_{EU}, we have n_{us} x 5,000m/533m $= 150/n_{EU}$, we then get $n_{EU} = 4$.

b) Since n is known from a), plug n_{us} and n_{EU} back into equation (2), we get $P_{US} = \$17.050$, $P_{EU} = \$17,038$.

c) With free trade, the combined market size is $S = 300 + 533 = 833$ million, so at the new equilibrium, using eq. (1) again, we have, n x 5,000m /833m + 17,000 = 150/n + 17,000, so n = 5. Then similarly, plug n = 5 back into equation (2), we get P = $17,030, which is lower than both P_{US} and P_{EU}. Also notice that n=5 < $n_{EU} + n_{us} = 7$.

d) Auto price is lower with trade as economies of scale (represented by larger combined automobile market) drives down the average cost of production, and the lower cost is transferred to consumer price under monopolistic competitive market. Compared to autarky, consumers are better off because i) they enjoy lower prices and ii) more varieties (n=5 is greater than either n_{EU} or n_{us}).