Problems 1 and 2. Supply and demand in the foreign exchange market.

We supply our own currency to the foreign exchange market when we demand the currency of another country in order to:

-- buy the goods or services exports of the foreign country
-- buy financial assets such as bank accounts, bonds or stocks.
-- buy businesses or property in the foreign country.

Note that a country's central bank may also supply its own currency or its holdings of foreign currency to the foreign exchange market in order to stabilize the value of its own currency (the Federal Reserve holds more than $ 40 billion worth of foreign currencies, and with the Treasury operates the Exchange Stabilization Fund).

See pages 383 - 387 of the text; especially note the factors that can shift the curves include not only increased demand for goods (due to increases in income) but also increased demand for assets (due to higher interest rates abroad, expected higher returns in the foreign stock market, and expected appreciation of the currency of the other country).

Note the Bank of International Settlements survey of the foreign exchange market, which indicates that the overwhelming majority of transactions are financial -- while spot purchases and some forward transactions are for goods trade, the bulk of transactions takes place in purely financial swap transactions. The daily volume of foreign exchange transactions was 1.8 trillion dollars in 2004, and it would take only about a week of foreign exchange transactions to finance ALL of world trade in goods.

Problem 3. Appreciate or depreciate?

a. The price of Swiss francs goes from 50 cents to 51 cents. The Swiss franc is more expensive, so the Swiss franc has appreciated and the dollar has depreciated.

b. The price of the dollar goes from 2.00 Swiss francs to 1.96 Swiss francs. The dollar is cheaper in terms of Swiss francs -- it has depreciated and the Swiss franc has appreciated. Note that this is really the same data as in part a, since if the exchange rate is 50 cents to a Swiss franc, it will cost 2 SF to buy a dollar. And if the exchange rate is 51 cents per Swiss franc, it will cost 1 / 0.51 = 1.96 SF to buy a dollar.

c. The spot rate goes from $ 0.01 per yen to $ 0.009 per yen. The yen has become cheaper, so the yen has depreciated and the dollar has appreciated.

d. The spot rate goes from 100 yen per dollar to 111 yen per dollar. The dollar has become more expensive, so the dollar has appreciated and the yen has depreciated. Again, this data is (almost) the same as in the previous part -- if it costs one cent to buy a yen, it will cost 100 yen to buy a dollar; if it costs $ 0.009 to buy a penny, it will cost 1 / 0.009 = 111 yen (and a bit more) to buy a dollar.

Problem 4. Using the FX market.

To buy one million yen worth of baseball cards produced in Japan, the US bubble-gum firm must first obtain the yen. It will ask its bank to buy yen, and the bank will either:

a. obtain the yen from the FX market, dealing with a Japanese bank which wants to buy dollars.

b. obtain the yen from the Federal Reserve, reducing its own reserves with the Fed and forcing the Fed to reduce its holdings of yen, which are part of the Federal Reserve's international reserves. (As we will see in later chapters, this will under a fixed exchange rate reduce the US money supply).

Problem 5. Using the FX market (from the British viewpoint). See text answer. The interbank market or specialized foreign exchange brokers will permit the trade of pounds for dollars to be made quickly.
Problem 6. Speculating on a rise in the euro.

If you think the euro will rise against the dollar in the next hour, buy euros now (at, say, $1.29 per euro) and sell them after they have risen (to say, $1.31 per euro). If you start with $1,290,000, you can buy one million euros, which will be worth $1,310,000 in the next hour -- you have made $20,000 for a quick transaction (it will take seconds, not minutes, if between banks or brokers, and might cost a hundred dollars or so for transaction costs).

If you think the euro will rise to $1.31 next month rather than in the next hour, you can effectively do the same thing without any money immediately changing hands -- sign a forward contract for (say) one million dollars at $1.30 per euro and you will be promising to buy euros at that rate in a month. The other party to the contract will be promising to sell you the euros at $1.30 (the other party also expects the euro to rise, but not as much as you do). If you are correct, you will have paid $1,300,000 for euros which will be worth $1,310,000. If you are not correct, and if the euro has fallen to (say) $1.27, the math is a little less pleasant.

Problem 7. Identifying demand and supply in the FX market.

a. Japanese firm cashes in its holdings of US government securities and wants to buy Japanese real estate. It exchanges the dollars it gets for the Treasury bills for yen -- it is supplying dollars and demanding yen.

b. US import company demands yen to pay for glassware and supplies dollars.

c. US farm cooperative receives payment from a Japanese importer of US oranges. Since the farm cooperative is unlikely to want yen, it will ask for payment in dollars. To get the dollars, the Japanese importer will have to supply yen to the FX market.

d. US pension fund buys stocks on the Tokyo stock exchange. To do so, it must buy yen -- it is supplying dollars to the FX market and demanding yen.

Problem 8. Triangular arbitrage.

If the current exchange rates are:

\[ \begin{align*}
\text{Yen per dollar} &= 0.01 \\
\text{Krone per dollar} &= 0.20 \\
\text{Krone per Yen} &= 25
\end{align*} \]

The implied cross rates can be calculated as:

\[ \frac{\text{Yen}}{\text{Yen per dollar}} = \frac{\text{Krone per dollar}}{\text{Krone per Yen}} = \frac{100}{5} = 20 \text{ yen per krone.} \]

Hence the yen is relatively cheap in Copenhagen -- you can buy 25 yen for one krone, not 20 as the cross rate calculation implies.

Start with a million dollars, buy five million krone and use the krone to buy 125 million yen, which enables you to wind up with $1,250,000 when you convert your yen back into dollars. Again, the transaction will takes seconds rather than minutes to arrange, and transactions costs are low.

Visit the Financial Times link (on my web page under Topics in International Finance) to the spot exchange rates of the day and choose any two major currencies, say dollars per pound and Swiss francs per dollar. Calculate the cross rate implied for Swiss francs per pound (setting up the problem is the largest part of the job), and then check to see if the actual rate for Swiss francs per dollar is out of line. The Financial Times also has a table of cross rates, but looking at it first would be cheating. You should be amazed if they are very much out of line (and any deviation is probably due to a time-of-day mismatch).
Problem 9. Why does the exchange rate change?  
To visualize the following, you must keep in mind a supply-demand graph FOR DOLLARS, with the vertical axis labeled “The price of dollars in Swiss Francs” or more briefly S.Fr / $ and the horizontal axis “Quantity of dollars” A movement up the vertical axis means that it costs more Swiss francs to buy a dollar – the dollar will have appreciated and the Swiss franc depreciated.

a. Increase in Swiss demand for exports means an increase in Swiss demand for dollars. The price of the dollar increases as the demand for dollars shifts to the right – the dollar appreciates. The quantity of dollars traded increases.

b. Increase in Swiss demand for exports means an increase in Swiss demand for dollars. The price of the dollar increases – the dollar appreciates.

c. US investors want to shift investments out of Switzerland – they cash them in for Swiss francs, then try to get dollars for the Swiss francs. The demand for dollars shifts to the right and the dollar appreciates.

d. US consumers worry about the danger of cheese and chocolates, and the demand for Swiss goods drops. The supply of dollars drops as well – and as a result, the dollar will appreciate.

Redo the above on a graph of the Swiss franc market – the vertical axis will be “dollars per Swiss franc”, so a movement up the axis will indicate that Swiss francs are becoming more expensive – the Swiss franc will appreciate and the dollar depreciate.

The first three parts (a, b and c) of the question involve an increase in the supply of Swiss francs so that the price of Swiss francs will drop, and the dollar again appreciates. The quantity of Swiss francs traded will also increase. Part d will be a drop in the demand for Swiss francs – the dollar again appreciates, but this time the quantity of Swiss francs traded also declines.

The case of an increase in the supply of dollars (perhaps due to an INCREASE in demand for Swiss francs due to higher Swiss interest rates) is illustrated below, with the old supply curve in red and the new supply curve in magenta – the price of dollars falls from 2.50 S.Fr to 1.50 S.Fr, and the quantity traded increases from 5 billion dollars to 7 billion dollars.

Problem 10. Defending the exchange rate. In all examples in problem 9, the Swiss franc depreciated against the dollar. Swiss monetary authorities would have to buy their own currency to maintain its value, which creates two potential problems -- first, they have to have the foreign exchange reserves to use to buy their own currency, and second, they would be contracting their own money supply (loss of reserves would translate into a shrinkage of the monetary base) unless they sterilized the impact of the purchase.