Note that $P_a > P_{Fr} > P_b$, where $P_a$ and $P_b$ are autarky prices, and $P_{Fr}$ is the free-trade price. Home consumers lose area $abcd$ when a tariff raises the home price, while home producers gain area $a$ and government gain $aq$ in tariff revenue. The home country thus gains $(g - bd)$ which can be positive. The foreign country's consumers gain area $e$ due to falling foreign prices, while foreign producers lose area $efgh$. The foreign country thus has a loss of areas $efgh$, and overall the loss is $bd$.

2) Each country's dominant strategy is to impose tariffs. Thus, the Nash Equilibrium is that both impose tariffs, even though free trade is socially optimal.

b) The WTO was created in 1995 as a formal (if small) organization to enforce GATT, the postwar agreements that reduced tariffs in eight rounds, and to provide an extension of GATT rules to many areas of exception, including services, intellectual property, agriculture, multilateral, and NTBs. Its basic principles of reciprocity, most-favored-nation status for contracting parties, multilateral negotiation, and transparency helped to create a level playing field that made trade liberalization possible. In particular, reciprocity effectively eliminated the off-diagonal cells of the prisoner's dilemma matrix, making free trade the dominant strategy. In response, world trade grew much faster as a percentage of world GDP.

*Also known as non-discrimination
a) An appropriate production tax would equal the marginal external cost. It would not affect consumers, since Brazil is small, but producers would lose areas abed in surplus, while tax collections would be by abc. The remaining loss of cd would be more than offset by the reduction in the marginal external cost, area ec, so Brazil gains overall.

b) Brazil's government may choose not to impose the tax for political reasons, e.g. they give more weight to the interests of producers than to society overall.

c) If the U.S. imposes a tariff, this should have no significant effect on the U.S. since Brazil is a small exporter and the U.S. is a large importer. If there was any effect, it would look like the graph in problem 1. For Brazil, their price would fall, producers would lose areas abed, while consumers gain area ec. The net loss of areas bcd is likely to be greater, much greater, than area ec, so Brazil is a net loser.

d) The tax is more efficient, and the tariff less so. The tax addresses the external cost directly by internalizing it into the costs of production, rather than indirectly through trade policy.

e) Though GATT allowed NTBs, like quotas, and many other exceptions in both agriculture and manufacturing, the Uruguay round which created the WTO agreed to phase these exceptions out. More importantly, the principle of non-discrimination (i.e., MFN status) makes it illegal to single out a specific country for a targeted tariff, especially since there is no harm to the U.S.

f) If the entire world is affected by the externality created by Brazilian beef production, then Brazil’s share is small and Brazil is unlikely to find the tax worthwhile (i.e., efficient for them). The best alternative is for the rest of the world to subsidize correction of the externality, by paying Brazil's government to levy the tax or to pay producers to reduce their production of beef.
The infant industry argument for protectionism is that a particular industry has a potential competitive advantage once it moves up the learning curve through experience. The net present value of future profits, spillovers, and lower prices for consumers would have to be greater than the current efficiency losses. Government intervention would be necessary if either capital markets had significant market failures, or future gains were not appropriable (i.e., there are significant externalities).

A subsidy would be relatively efficient compared to a tariff: with a subsidy, consumers are unaffected, producers gain area \( a \), and the government pays areas \( ab + b \); with a tariff, consumers lose areas \( abcd \), producers gain \( a \), and government gains \( c \). Though the subsidy loses \( b \) and the tariff loses \( ab cd \), government might prefer revenue to expense. There may also be rent-seeking costs and X-inefficiency to consider.

5 a) \( B_{op} = 719 - 114 = 427 \)
   \( B_{os} = 279 - 210 = 69 \)
   \( B_{of} = 284 - 269 = 15 \)
   \( B_{ac} = -427 + 69 + 15 = 49 = -392 \)

b) Balance on non-reserve financial account (net capita account) = \( 753 - 371 = 382 \)
   Since the reserve account = \( 5 - 5 = 0 \), and \(-392 + 382 + 0 + SD = 0\),
   then \( SD = 10 \)

   c) The value of the dollar would fall (that is, \( E_t^f \))

6 a) \( R = R^* + \left( \frac{E_t^f}{E} - 1 \right) \)

b) \( R^* = 3.8\% \)

c) \( 1 \text{ euro} = 0.97 \times \frac{1}{1.506} = 1.506 \text{ Canadian Dollars} \)

d) If \( R \) is expected to rise in the future, \( E \) will fall then. Thus, \( E_t^f \) will fall now, and the current spot rate falls too.
(7) a) $E\downarrow$  b) $E\downarrow$  c) $E\downarrow$  d) $E\uparrow$  e) $E\uparrow$

**Bonus:**

a) If $[100-P_a] = [P_a-20]$, then $ZP_a=120$ and $P_a=60
\quad \Delta D = [100-P_a] - [P_a-20] = 120-2P_a$

b) If $100-P_b = ZP_b-20$, then $3P_b=120$ and $P_b=40
\quad \Delta S = [2P_b-20] - [100-P_b] = 3P_b-120$

c) If $[120-ZP] = [ZP-120]$, then $5P=240$ and $P=48, \text{ Volume}=24$

d) If $[120-2(P_b+1)] = [3P_b-120]$, then $P_b=46$ and $P_a=P_b+5=51$
\quad \text{Volume} = 120-2(51) = 3(46)-120 = 18$

e) Net change in home welfare = $+g - bd = 36 - \frac{6\times 8}{2} = +27$
\quad \text{Net change in foreign welfare} = -fh = -2\times \frac{\frac{3}{2}\times \frac{8}{2}}{2} = -42$
\quad \text{Net change in world welfare} = -bd - fh = 5\times (24-18)\sqrt{2} = -15