1. $e = \frac{\Delta q}{q} \times \frac{p}{\Delta p}$,when $\Delta p \to 0$,we have $e = \frac{dq}{dp} \times \frac{p}{q}$.Because $p = 1 - q$,so $e = \frac{dq}{dp} = -1$.
   Hence:$e = 0, (p, q) = (0, 1)$;$e = -1, (p, q) = (0.5, 0.5)$;$e = -\infty, (p, q) = (1, 0)$.

2. (a)The equilibrium price of coconuts will be 6 and the equilibrium quantity supplied will be 600.

   (b) One day, King Kanuta decided to tax his subjects in order to collect coconuts for the Royal Larder. The king required that every subject who consumed a coconut would have to pay a coconut to the king as a tax. Thus, if a subject wanted 5 coconuts for himself, he would have to purchase 10 coconuts and give 5 to the king. When the price that is received by the sellers is p_S, how much does it cost one of the king's subjects to get an extra coconut for himself? $2p_S$.

   (c) When the price paid to suppliers is p_S, how many coconuts will the king's subjects demand for their own consumption? (Hint: Express p_D in terms of p_S and substitute into the demand function.) Since $p_D = 2p_S$, they consume $1200 - 200p_S$.

   (d) Since the king consumes a coconut for every coconut consumed by the subjects, the total amount demanded by the king and his subjects is twice the amount demanded by the subjects. Therefore, when the price received by suppliers is pS, the total number of coconuts demanded per week by Kanuta and his subjects is $2400 - 400p_S$.

   (e) Solve for the equilibrium value of pS 24/5 , the equilibrium total number of coconut-s produced 480 , and the equilibrium total number of coconuts consumed by Kanuta's subjects. 240.

3. (a)$minC = w_k K + w_l L, s.t\ Q = K^\alpha L^\beta$.We have $L = Q^{\frac{1}{\alpha+\beta}}(\frac{\beta w_k}{\alpha w_l})^{\frac{\alpha}{\alpha+\beta}}$,$K = Q^{\frac{1}{\alpha+\beta}}(\frac{\alpha w_L}{\beta w_K})^{\frac{\beta}{\alpha+\beta}}$.
   Hence,the cost function is$C = [(\frac{\alpha}{\beta})^{\frac{\alpha}{\alpha+\beta}} + (\frac{\beta}{\alpha})^{\frac{\beta}{\alpha+\beta}}]w_K^{\frac{\alpha}{\alpha+\beta}} w_L^{\frac{\beta}{\alpha+\beta}} Q^{\frac{1}{\alpha+\beta}}$.
   (b)$AC = [(\frac{\alpha}{\beta})^{\frac{\alpha}{\alpha+\beta}} + (\frac{\beta}{\alpha})^{\frac{\beta}{\alpha+\beta}}]w_K^{\frac{\alpha}{\alpha+\beta}} w_L^{\frac{\beta}{\alpha+\beta}} Q^{\frac{1-\alpha-\beta}{\alpha+\beta}}$.
   Hence by derivation for Q,we have:

$$AC'(Q) > 0, if \alpha + \beta < 1;$$

$$AC'(Q) = 0, if \alpha + \beta = 1;$$

$$AC'(Q) < 0, if \alpha + \beta > 1.$$

4. (a) Lady Wellesleigh can either make silk purses or she can earn 5 an hour as a seamstress in a sweatshop. If she worked in the sweat shop, how many hours would she work? 8. (Hint: To solve for this amount, write down Lady Wellesleigh's budget constraint and recall how to

nd the demand function for someone with a Cobb-Douglas utility function.)

(b) If she could earn a wage of w an hour as a seamstress, how much would she work? 8 hours.

(c) If the price of silk purses is p, how much money will Lady Wellesleigh earn per purse after she pays for the sows' ears that she uses? $p - 1$.

(d) If she can earn 5 an hour as a seamstress, what is the lowest price at which she will make any silk purses? 6.

(e) What is the supply function for silk purses? (Hint: The price of silk purses determines the wage rate that Lady W. can earn by making silk purses. This determines the number of hours she will choose to work and hence the supply of silk purses.) $S(p) = 8$ for $p > 6, 0$otherwise.

5. (a) The probability that a smuggled parrot will reach the buyer alive and uncon

scated is 0.45. Therefore when the price of smuggled parrots is p, what is the expected gross revenue to a parrot-smuggler from shipping a parrot? $0.45p$.

(b) What is the expected cost, including expected

nes and the cost of capturing and shipping, per parrot? $0.10 \times 500 + 40 = 90$.

(c) The supply schedule for smuggled parrots will be a horizontal line at the market price 200. (Hint: At what price does a parrot-smuggler just break even?)

(d) The demand function for smuggled cockatoos in the United States is $D(p) = 7200 - 20p$ per year. How many smuggled cockatoos will be sold in the United States per year at the equilibrium price? 3200. How many cockatoos must be caught in Australia in order that this number of live birds reaches U.S. buyers? $3200/0.45 = 7111$.

(e) Suppose that instead of returning live confiscated cockatoos to the wild, the customs authorities sold them in the American market. The profits from smuggling a cockatoo do not change from this policy change. Since the supply curve is horizontal, it must be that the equilibrium price of smuggled cockatoos will have to be the same as the equilibrium price when the confiscated cockatoos were returned to nature. How many live cockatoos will be sold in the United States in equilibrium? 3200. How many cockatoos will be permanently removed from the Australian wild? 6400.

(f) Suppose that the trade in cockatoos is legalized. Suppose that it costs about 40 to capture and ship a cockatoo to the United States in a comfortable cage and that the number of deaths in transit by this method is negligible. What would be the equilibrium price of cockatoos in the United States? 40. How many cockatoos would be sold in the

United States? 6400. How many cockatoos would have to be caught in Australia for the U.S. market? 6400.