SOLUTIONS - PROBLEM SET 10

① a) The long-run supply is given by: $P = 10$. It is horizontal at $P = 10$ because i) minimum LRAC is 10 and 2) it is a constant cost industry.

b) i) LR equilibrium price = 10

ii) $Q = 1500 - 50(10) = 1000$

iii) q = firm output = 20 (each firm produces at efficient scale)

iv) Number of firms = $1000/20 = 50$

v) $\pi = 0$ for each firm ($P = AC \Rightarrow \pi = 0$)

c) $SAC = \frac{C(q)}{Q} = 0.5q - 10 + 200/q$

$SMC = \frac{dC(q)}{dQ} = q - 10$

$\frac{dSAC}{dQ} = 0.5 - 200/q^2 = 0 \Rightarrow q^2 = 400 \Rightarrow q = 20$ is where SAC is minimized (could also find $q = 20$ by setting SAC = SMC and solving for q).

d) $VC = 0.5q^2 - 10q$ $AVC = 0.5q - 10$ $AVC > 0$ for $q > 20$

$P = SMC \Rightarrow P = q - 10$, or $q = P + 10$ for $q \geq 20$ or $P \geq 10$

$Q = 50q = 50(P + 10) \Rightarrow Q = 50P + 500$ (industry supply)

e) $2000 - 50P = 50P + 500 \Rightarrow 100P = 1500 \Rightarrow P^* = 15$ $Q^* = 2000 - 50(15) = 1250$

i) 15 ii) 1250 iii) $q = Q/50 = 1250/50 = 25$ iv) no entry or exit at this point, so number of firms is still 50

v) $\pi = (P - AC)q$ $AC = .5(25) - 10 + 200/25 = 10.5 \Rightarrow \pi = (15 - 10.5)25 = 112.50$

f) i) LR equilibrium price = 10

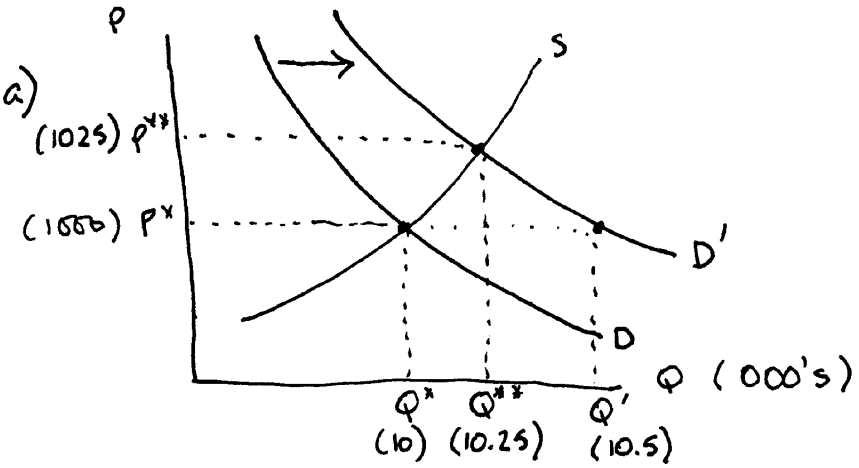
ii) $Q = 2000 - 50(10) = 1500$

iii) $q = 20$ (each firm produces again at efficient scale)

iv) number of firms = $Q/q = 1500/20 = 75$

v) $\pi = 0$ in the new long run equilibrium

② a)



b) There will be an increase in demand for Bermuda vacations ($D \Rightarrow D'$)

c) The cross price elasticity is .5, so the quantity demanded of Bermuda vacations will increase by $.5 \times 10 = 5$ percent

d) From c) quantity demanded will increase by 5 percent, from 10 to 10.5 - see graph.

e) Use $e_{P,\alpha} = \dfrac{e_{Q,\alpha}}{e_{S,P} - e_{Q,P}} = \dfrac{.5}{1 - (-1)} = .25$

So if the price of Florida vacations increases by i) 5 percent, then price of Bermuda vacations will increase by $.25 \times 5 = 1.25$ percent and if ii) 10 percent $\Rightarrow .25 \times 10 = 2.5$ percent

f) $P^{**} = 1000\,(1.025) = 1025$

g) Use the supply elasticity: $1 \times 2.5 = 2.5$ percent

h) $Q^{**} = 10{,}000 \times 1.025 = 10{,}250$

i) See graph.