COMM 220 – PRACTICE PROBLEM SET 3 SOLUTIONS (Part II)

4. For the 6 firms: MC = P = 4q

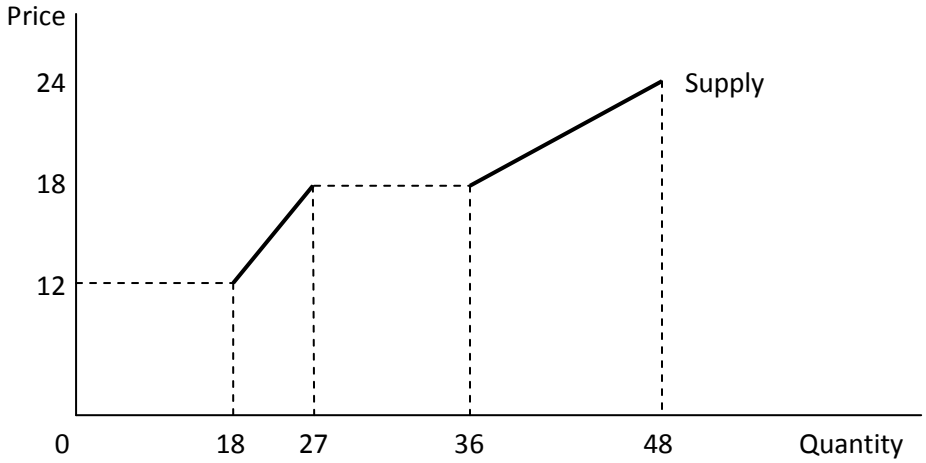
   $\Rightarrow$ these 6 firms have supply curves: q = P/4 if P $\geq$ \$12 and q = 0 if P < \$12

   For the 4 firms: MC = P = 8q

   $\Rightarrow$ these 4 firms have supply curves: q = P/8 if P $\geq$ \$18 and q = 0 if P < \$18

   The short-run market supply curve, Q:

$$\begin{cases} Q = 0 & \text{if } P < 12 \\ Q = 6*P/4 = 1.5P & \text{if } \$12 \leq P < \$18 \\ Q = 6*P/4 + 4*P/8 = 2P & \text{if } P \geq \$18 \end{cases}$$



5. (a) $VC = 0.024q^2 + 6q$

   FC = 2535

   ATC = 0.024q + 6 + 2535/q

   AVC = 0.024q + 6

   AFC = 2535/q

   MC = 0.048q + 6

   (b) P > min ATC and min ATC occurs when MC = ATC

   0.048q + 6 = 0.024q + 6 + 2535/q

   $q = (2535/0.024)^{0.5} = 325$

$P > 0.048(325) + 6 = \$21.6$

(c) Profit maximized when P = MC

$30 = 0.048q + 6$

$q = 24/0.048 = 500$

Producer surplus = $(30)(500) - [0.024(500^2) + 6(500)] = \$6000$

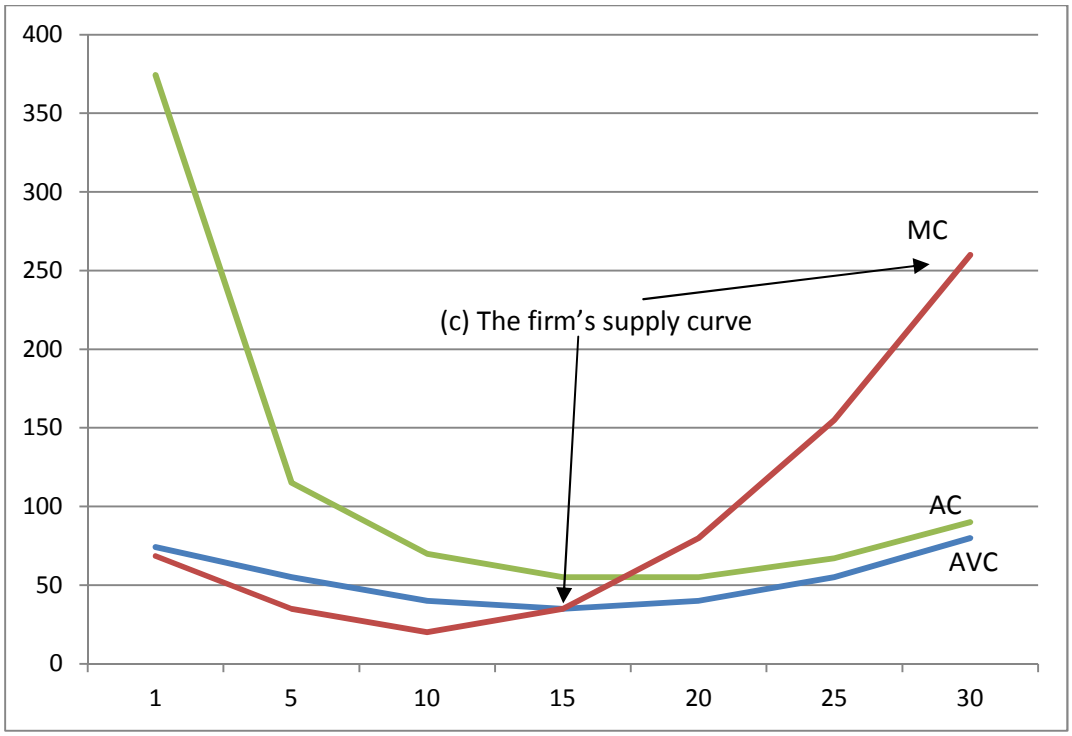
Profit = $(30)(500) - [0.024(500^2) + 6(500) + 2535] = \$3465$

6. (a) $AC(q) = C/q = 300/q + 80 - 6q + 0.2q^2$

$AVC(q) = VC/q = 80 - 6q + 0.2q^2$

$MC(q) = dC/dq = 80 - 12q + 0.6q^2$

q	AC(q)	AVC(q)	MC(q)
1	374.2	74.2	68.6
5	115	55	35
10	70	40	20
15	55	35	35
20	55	40	80
25	67	55	155
30	90	80	260



(b) The firm will supply zero output when P < min AVC. AVC is minimized when AVC=MC

$80 - 6q + 0.2q^2 = 80 - 12q + 0.6q^2$

$q = 6/0.4 = 15$

P < min AVC = \$35

(d) When $q = 40$, $P = MC = 80 - 12(40) + 0.6(40^2) = \$560$