(1) a) $f(S,B) = \min[2S, B]/12$

Constant. Show proof.

b) $\min[S,B]$ st $f(S,B) = \bar{Q}$

$S = 6Q \quad B = 12Q$

(2) a) $R = 250Q$; $250 = MR$

b) $VC = Q^2 + 200Q$, $MC = 2Q + 200$

c) $MC = MR \Rightarrow 250 = 2Q + 200 \Rightarrow Q = 25$; $\Pi = 250(25) - (25^2 + 200(25)) = 625$

d) $6250 - [25^2 + 100 \times 25 \times 1.5] = \Pi_1 = 1875$

$3 = \Pi_2 = -1875$

e) $V_E = 1 \times 1/3 + 0 \times 2/3 = 1/3$

f) ~~$\Pi_1 = 1875 + 1/3(Q) = \Pi_2 = -1875 + Q - (1/3C)$~~

~~$Q = 3750$~~

(3) a) $\min 64x + y + 8$, st $8x^{1/3} = \bar{Q}$

$x = \left(\frac{\bar{Q}}{8}\right)^3$

$VC = 64x = Q^3/8$

$TC = 64x + 8 = Q^3/8 + 8$

b) $MC = \frac{3}{8}Q^2$; $AC = \frac{Q^3/8 + 8}{Q}$; $MC = AC \Rightarrow Q = \sqrt[3]{32}$ ILL↓

c) $MRTS = \frac{4/3\, x^{-2/3} y^{1/3}}{4/3\, x^{1/3} y^{-2/3}} = y/x = 64 \Rightarrow y = 64/x$

$\bar{Q} = 4x^{1/3}y^{1/3} = 4x^{1/3}(64x)^{1/3}$

$x = \bar{Q}/64 \quad y = \bar{Q}^{3/2}$

$VC = 64x + y = 2Q^{3/2}$ ~~$\bar{Q}^{-3/2}$~~

$TC = VC$

d) $MC = \frac{3}{2}Q^{1/2}$; $AC = \frac{2Q^{3/2}}{Q} = 2\sqrt{Q}$

e) $8 = Q^{3/2} \quad Q = 4$

SR & LR are =

f) GRAPH

(4) a) $MC = AC$ $MRTS: \frac{\partial Q/\partial L}{\partial Q/\partial K} = \frac{K}{L} = 4 \rightarrow K = 4L \rightarrow \bar{Q} = 20L^{1/4}(4L)^{1/4} = 20\sqrt{2L}$

$\Rightarrow Q/20 = \sqrt{2L} \Rightarrow L = Q^2/800 \quad K = Q^2/200$; $C = 16L + 4K$

$C = \frac{Q^2}{50} + \frac{Q^2}{50} = \frac{Q^2}{25}$

b) $AC = (.04Q^2 + 64)/Q$ $MC = .08Q$

$MC = AC \Rightarrow Q = 40$ GRAPH Scale economies: $Q < 40$

c) $Q_D = 9200 - 400P$

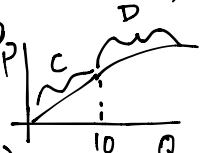
$Q_D(4) = 7600$

$.08Q = 4 \quad Q = 50$

Supernormal, bc they sell 50, where normal profits occur @ 40

d) ND, $40(.08) = \$3.2$. $Q = 40$. $Q_P = 9200 - 400(3.2) = 7920$. $\frac{7920}{40} = 198$

5



b) $L = Q \quad Q < 10, Q = 10 + \sqrt{L - 10} \Rightarrow (Q-10)^2 + 10 = L \quad C = 2L$

$C = 2L \Rightarrow C = 2Q + 100Q^1 = 102Q \quad Q < 10 \quad 2(Q-10)^2 + 20 + 100Q + 230 = C$ (+230)

VC = ↑ TC w/ 230

MC to 10 : 102

MC past 10: $4Q - 40 + 100 = 4Q + 60$

AC to 10: 102

AC after 10: $\frac{2(Q-10)^2 + 20 + 230 + 100Q}{Q}$

c) GRAPH AC = 120

$MC = AC \Rightarrow Q = 15$

d) $P = 4Q_S + 60 \Rightarrow Q_S = \frac{P - 60}{4}$

$Q_S(160) = 25$

Supernormal (> 15)

GRAPH

e) Exit, price rises st $Q = 15$, per firm $\Rightarrow P = 120$

f) $P = 120$, $Q = 270$, $\eta = 270/15 = 18$

g) $VC = 2(Q-10)^2 + 20 + 110Q$

$MC = 4Q + 70$

$AC = \frac{2(Q-10)^2 + 20 + 110Q + 230}{Q}$ $MC = AC \Rightarrow Q =$

h) $Q = 15$, $P = 130$

$Q_d \downarrow$ $390 - 130 = 260$ $260/15 = 17.\overline{3}$

(6) a) $AC = \frac{2Q^2 + 8Q + 80}{Q}$ $MC = .4Q + 8$

$AC = MC \Rightarrow Q = 20$ GRAPH

b) $Q_s = \frac{P-8}{.4}$ $Q_{s_{ag}} = 6\frac{P-8}{.4}$

c) $220 - 2P = \frac{6(P-8)}{.4} \Rightarrow P = 20$ GRAPH

d) $\frac{6(20-8)}{.4} / 6 = 30$

$\frac{\partial Q_d}{\partial P} \cdot \frac{P}{Q_d} = -2 \cdot \frac{20}{\frac{180}{6}} = -4/3$

e) Dist btwn MC + ATC x Q

(7) a) $\frac{-2Q^2 + 5Q + 500}{Q} = AC$ $MC = .4Q + 5$ $AC = MC \Rightarrow Q = 50$

Plugging $Q = 50$ into $MC \Rightarrow P < 25 \Rightarrow$ Shutdown

b) $MC_{|Q=50} = 25$ $Q_d(25) = 300$

$300/50 = 6$

c) $MC = .4Q + 8$ $AC = \frac{.2Q^2 + 8Q + 500}{Q}$ $AC = MC \Rightarrow Q = 50$

d) $P = .4Q + 8 \Rightarrow Q = \frac{P-8}{.4}$

$Q_{ag} = \frac{6(P-8)}{.4}$

e) $\frac{6(P-8)}{.4} = 487.5 - 7.5P \;/\; P = 27$

$Q = 285$

f) GRAPH

g) 285/50 = 5.7