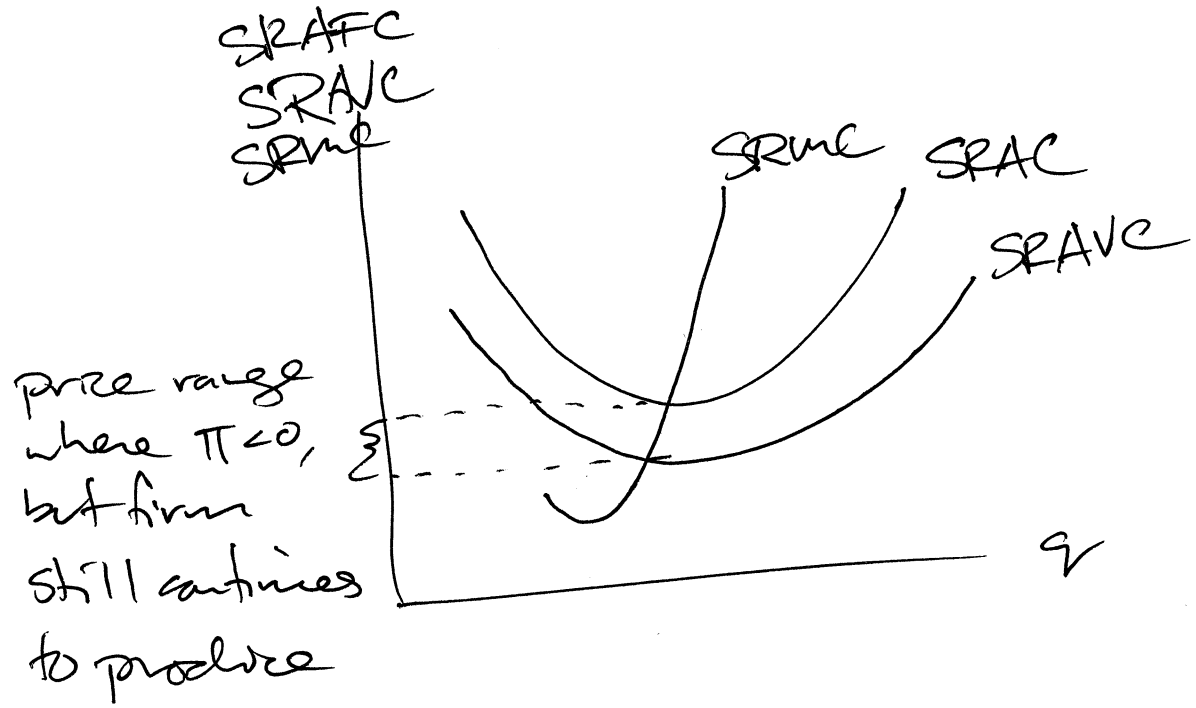
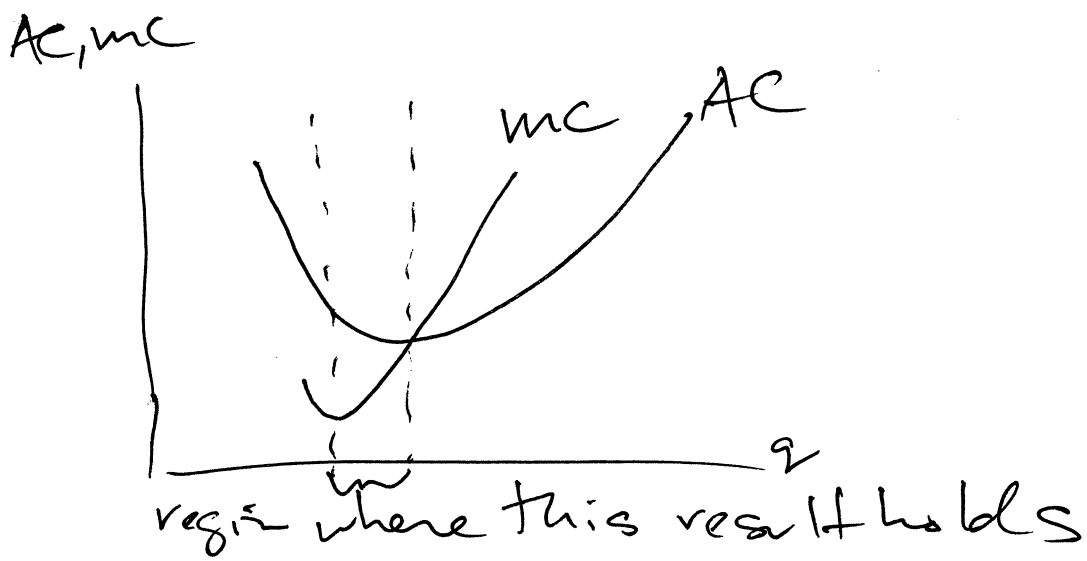
MET II - Answer Key

(1) A firm may continue to produce in the short run if SRAVC < P.



(2) For an optimal scale total cost curve MC begins to increase prior to AC.



(3) necessary condition

$$\frac{MP_K}{r} = \frac{MP_L}{w}$$

$$\frac{16}{4} = 4 > 2 = \frac{12}{6}$$

the last unit of capital per dollar was more productive than the last unit of labor per dollar
we should $\uparrow K \Rightarrow \downarrow MP_K$ & $\downarrow L \Rightarrow$
$\uparrow MP_L$ until the equality holds

(4)

$$PV = \frac{R-M}{1+r} + \frac{R-M}{(1+r)^2} + \frac{S}{(1+r)^2}$$

$C = 90$
$R = 50$
$M = 20$
$r = 1$
$T = 2$
$S = 20$

$$PV = \frac{50-20}{1+1} + \frac{50-20}{(1+1)^2} + \frac{30}{(1+1)^2}$$

$$= \frac{30}{2} + \frac{30}{4} + \frac{30}{4}$$

$$= 30\left(\frac{1}{2} + \frac{1}{4} + \frac{1}{4}\right)$$

$$= 30 < 90 \Rightarrow$$

we should not purchase it

(5) (a) $q = k^{\frac{1}{3}} L^{\frac{1}{3}}$

$$q(\lambda K, \lambda L) = (\lambda K)^{\frac{1}{3}} (\lambda L)^{\frac{1}{3}}$$

$$= \lambda^{\frac{1}{3}} K^{\frac{1}{3}} \lambda^{\frac{1}{3}} L^{\frac{1}{3}}$$

$$= \lambda^{\frac{2}{3}} K^{\frac{1}{3}} L^{\frac{1}{3}}$$

$$= \lambda^{\frac{2}{3}} q < \lambda q \Rightarrow \text{DRS}$$

(b) $q = k^{\frac{1}{3}} L^{\frac{1}{3}} + K^{\frac{2}{3}}$

$$q(\lambda K, \lambda L) = (\lambda K)^{\frac{1}{3}} (\lambda L)^{\frac{1}{3}} + (\lambda K)^{\frac{2}{3}}$$

$$= \lambda^{\frac{1}{3}} K^{\frac{1}{3}} \lambda^{\frac{1}{3}} L^{\frac{1}{3}} + \lambda^{\frac{2}{3}} K^{\frac{2}{3}}$$

$$= \lambda^{\frac{2}{3}} K^{\frac{1}{3}} L^{\frac{1}{3}} + \lambda^{\frac{2}{3}} K^{\frac{2}{3}}$$

$$= \lambda^{\frac{2}{3}} \left(K^{\frac{1}{3}} L^{\frac{1}{3}} + K^{\frac{2}{3}} \right)$$

$$= \lambda^{\frac{2}{3}} q < \lambda q \Rightarrow \text{DRS}$$

(6) $P = 10 - \frac{Q}{10}$

$MR = 10 - \frac{Q}{5}$ ($\Leftarrow$ twice the slope)

(a) $MR = MC$

$$10 - \frac{Q}{5} = 4$$

$$6 = \frac{Q}{5}$$

$$Q^* = 30$$

(b) $MR = 0$ ($\Leftarrow$ no more revenue)

$$10 - \frac{Q}{5} = 0$$

$$\frac{Q}{5} = 10$$

$$Q^{**} = 50$$