Solutions

2010 Fall Final Exam

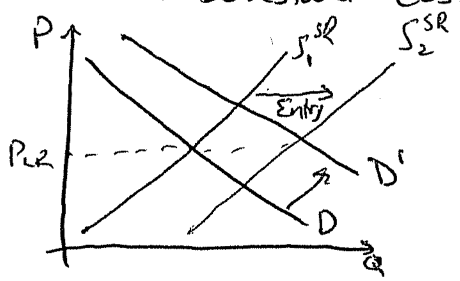
(1) a.

		TV	
		Open	No open
TSC	Open	4, 12	6, 15
	No open	3, 20	5, 18

TSC has a dominant strategy to open

The Nash equilibrium is TSC opening and TV not opening

b. True if a constant cost industry. Price increases above min AC in short-run



⇒ Profits

⇒ Induces Entry

⇒ Shifts out SR industry supply curve until price falls back to min AC

c. Profits: $\Pi = PQ - 10 - Q^2$

Max profits: $\frac{d\Pi}{dQ} = 0 \Rightarrow P = 2Q$ ↓ MC

This is the short run supply curve since the fixed cost of 10 is sunk

d. Uncertain

wage ↑ sub. effect → work more

inc. effect → Work less (if leisure is normal good)

Total effect unclear

e. Find MRS: $-\frac{MU_1}{MU_2} = -\frac{2x_1x_2}{x_1^2} = -\frac{2x_2}{x_1}$

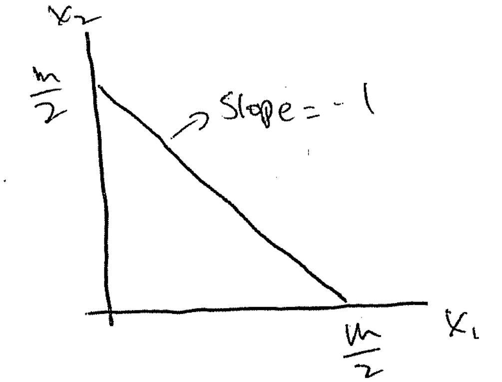
Uncertain → Depends on amount of each good that the consumer is consuming

f. 1^{st} degree price discrim: Each consumer charged his or her WTP

2^{nd} degree: Price depends on quantity

3^{rd} degree: Price depends on some identifiable characteristic

② a.



$$MRS = -\frac{MU_1}{MU_2} = -\frac{2/x_1}{1/x_2} = -2\frac{x_2}{x_1}$$

Well behaved: Convex, more preferred to less

b. ① $-\frac{P_1}{P_2} = MRS$ ② $2x_1 + 2x_2 = m$ ⇐ Two conditions hold at optimum

$$-\frac{P_1}{P_2} = -2\frac{x_2}{x_1}$$

$$-1 = -2\frac{x_2}{x_1}$$

$$x_2 = \frac{1}{2}x_1$$

substitute

$$2x_1 + 2\left(\tfrac{1}{2}x_1\right) = m$$

$$3x_1 = m$$

$$x_1 = \frac{m}{3}$$

$$x_2 = \frac{m}{6}$$

c. ① $-\frac{P_1}{P_2} = MRS$ ② $2x_1 + 1x_2 = m$

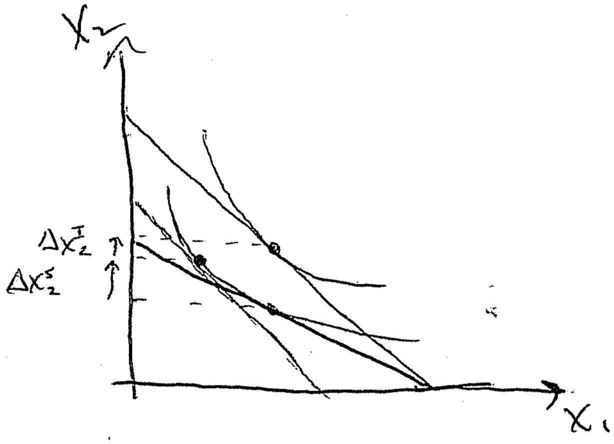
$$\Rightarrow -2 = -2\frac{x_2}{x_1}$$

$$x_1 = x_2$$

$$2x_1 + 1x_1 = m$$

$$x_1 = \frac{m}{3}$$

$$x_2 = \frac{m}{3}$$



Both the income and substitution effects suggest an increase in the consumption of x_2, so we can conclude that x_2 will rise

③ a. CRS: Scale up all inputs by λ:

$$f(\lambda x_1, \lambda x_2) = (\lambda x_1)^{3/4} (\lambda x_2)^{1/4}$$
$$= \lambda x_1^{3/4} x_2^{1/4}$$
$$= \lambda f(x_1, x_2)$$

b. minimize cost:

$$C = 15x_1 + 5x_2$$

Subject to the constraint $y = f(x_1, x_2)$

Two conditions hold: ① $MRTS = \cancel{\frac{MP}{MP}} - \frac{MP_1}{MP_2} = -\frac{w_1}{w_2}$

$$-\frac{\frac{3}{4} x_1^{-1/4} x_2^{1/4}}{\frac{1}{4} x_1^{3/4} x_2^{-3/4}} = -3$$

$$3\frac{x_2}{x_1} = 3 \Rightarrow x_2 = x_1$$

② $y = x_1^{3/4} x_2^{1/4}$

Substitute using ①

$y = x_1^{3/4} x_1^{1/4}$

$x_1 = y$ and $x_2 = y$

these are the conditional factor demand curves

c. $C(y) = 15x_1(y) + 5x_2(y)$
$= 15y + 5y = 20y$

would expect a price of 20 since this is marginal cost.

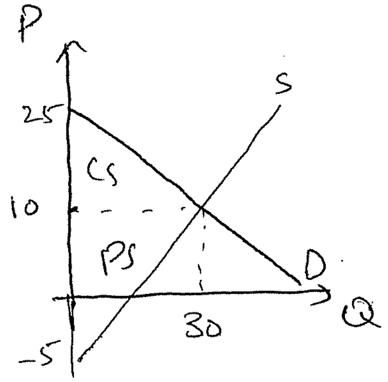
④ a. $Q_S = Q_D \Rightarrow \quad 10 + 2P = 50 - 2P$

$$4P = 40$$

$$P = 10$$

$$\Rightarrow Q = 30$$

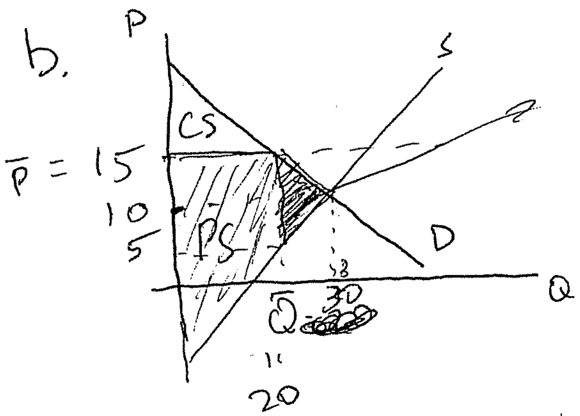
b.



$CS = \frac{1}{2}(25 - 10)(30) = 225$

$PS = \frac{1}{2}(10 - -5)(30) = 225$

b.



$DWL = \frac{1}{2}(15-5)(30-20)$

$= 50$