

Your Name
(print clearly):

prelim 2
3130-F08
ANSWERS

CORNELL UNIVERSITY OFFICIAL EXAMINATION BOOK

Course: _____

Student's College: _____

Date of Examination: _____

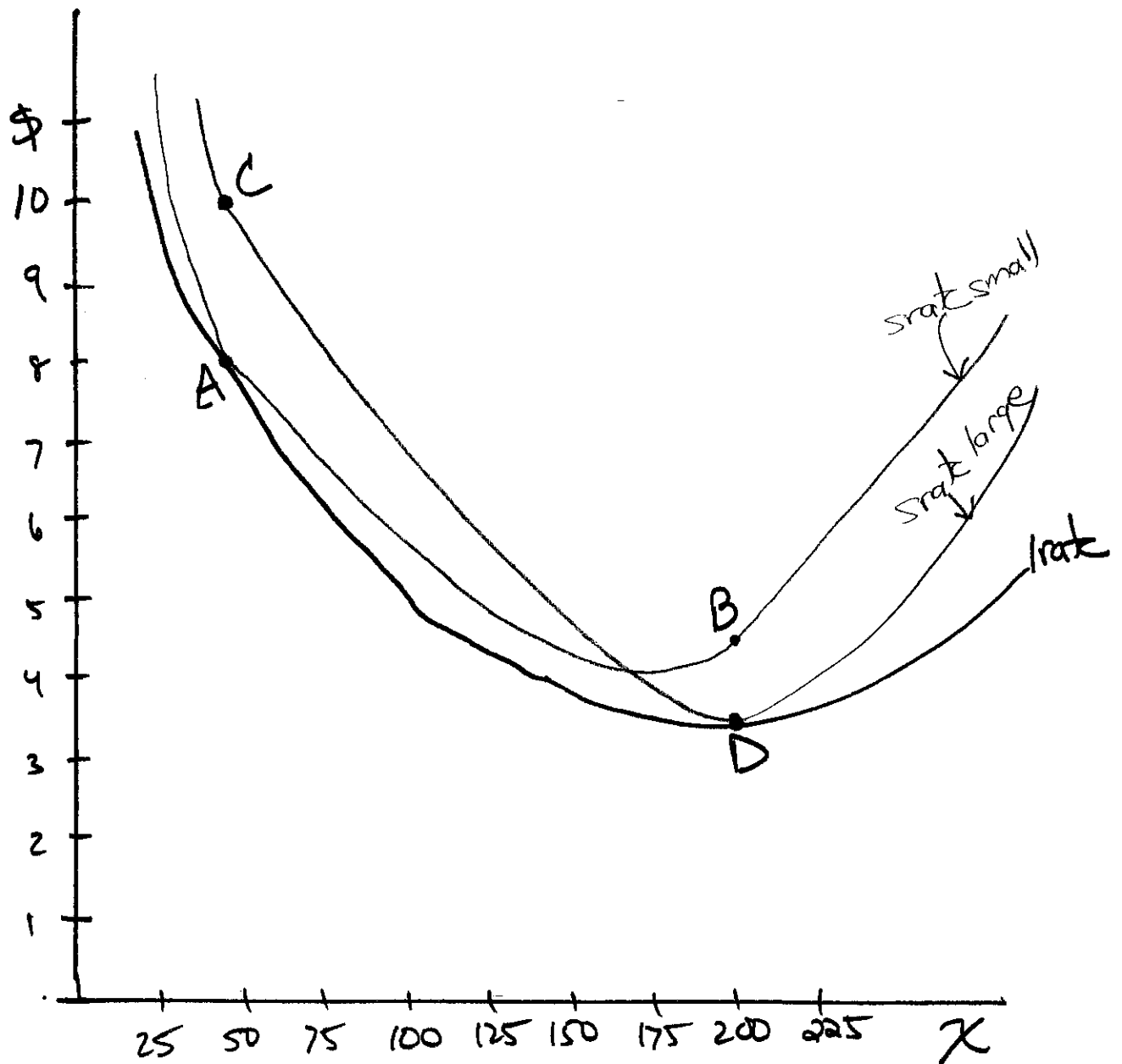
Academic integrity is expected of all students of Cornell University at all times, whether in the presence or absence of member of the faculty.

Understanding this, I declare that I shall not give, use or receive unauthorized aid in this examination.

Signature of Student

PRINTED BY AUTHORITY OF CORNELL UNIVERSITY

re: LR & SR average total cost curves:



	<u>X</u>	<u>TC</u>	<u>ATC</u>	<u>curve</u>
A	40	320	8.00	rate & srate small
B	200	900	4.50	srate small
C	40	400	10.00	srate large
D	200	700	3.50	rate & srate large

re: Gizmos.

$x = K + 4L \Rightarrow$ perfect substitutes technology

a. Yes, tech is constant returns to scale.
Either prove (or) give example with numbers.

proof $x = K + 4L$, consider $y = \theta K + 4\theta L$ for any $\theta > 1$

example $\Rightarrow y = \theta [K + 4L] \Rightarrow y = \theta x \Rightarrow$ CRTS.
 $K=1, L=1 \Rightarrow x=5$ & $K=2, L=2 \Rightarrow x=10$

b. In long-run we have a corner solution. Use only the input that gives the better "bang/buck" which is $\frac{MP_{input}}{P_{input}}$. So... $\frac{MP_K}{P_K} = \frac{1}{8}$ and

$\frac{MP_L}{P_L} = \frac{4}{16} = \frac{2}{8}$, So... use only Labor.

$\Rightarrow x = 4L \Rightarrow \begin{cases} K^*(x) = 0 \\ L^*(x) = \frac{1}{4}x \end{cases}$

$\Rightarrow \text{rtc} = wL^*(x) + rK^*(x) = \frac{16}{4}x + 0$

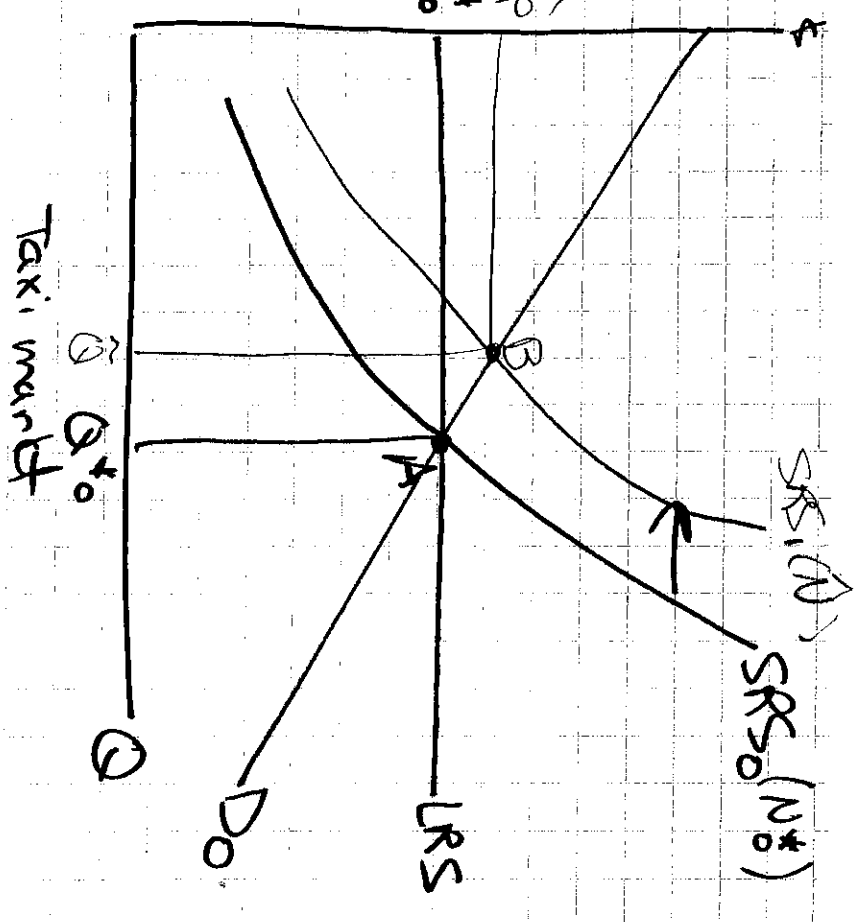
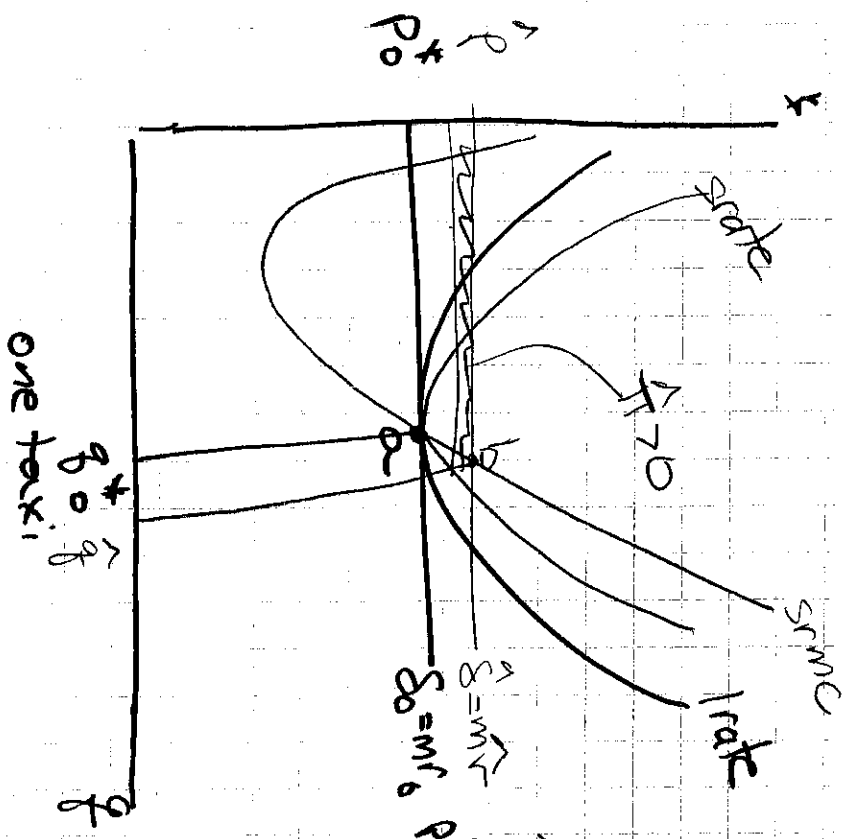
$\Rightarrow \boxed{\text{rtc} = 4x}$

c. If $\bar{K} = 10 \Rightarrow x = 10 + 4L$.

\Rightarrow For $x \leq 10$ $L^*(x) = 0$ & use $\bar{K} = 10$

\Rightarrow For $x > 10$ $L^*(x) = \frac{x-10}{4}$

$\Rightarrow \text{rtc} = \begin{cases} \$80 & \text{for } x \leq 10 \\ \$40 + 4x & x > 10 \end{cases}$



- $P_0^*, Q_0^*, g_0^*, N_0^* + \pi_0^* = 0$ \leftarrow taxis. (A + a)
- SRS shifts to the left. Get \tilde{P} , \tilde{Q} , \tilde{g} w/ \tilde{N} (where $\tilde{N} = \#$ licenses) and $\pi > 0$ for the lucky guys. Now in a long-run dis-equilibrium situation, since new firms not allowed to enter.
- Value of the license/medallion is the amount π . It's the profit you get from your "windfall" getting the license for free.

Since Fred is richer and there is diminishing marginal utility of \$, the 100,000 loss isn't as big a deal.

re: Joe ... $u = \sqrt{\$}$

$$W_g = 100,000 + 5,625 \quad w/ \text{ prob } 1/2$$

$$W_b = 0 \quad w/ \text{ prob } 1/2$$

$$a. EU^{\text{Joe}} = \frac{1}{2} \sqrt{105625} + \frac{1}{2} \sqrt{0} = 162.50 \text{ utils}$$

$$b. \$CE = \$26,406.25 = (162.50)^2$$

c. For insurance set $W_g = W_b = \$CE$

$$\text{good: } 26,406.25 = 100,000 + 5,625 - \text{Premium}$$

$$\Rightarrow \text{Premium} = \$79,218.75$$

$$\text{bad: } 26,406.25 = 100,000 - 100,000 - 79,218.75 + \text{Benefit}$$

$$\Rightarrow \text{Benefit} = \$105,625$$

d. For Fred ...

$$W_g = 205,625 \quad w/ \text{ prob } 1/2$$

$$W_b = 100,000 \quad w/ \text{ prob } 1/2$$

$$\Rightarrow EU^{\text{Fred}} = \frac{1}{2} \sqrt{205625} + \frac{1}{2} \sqrt{100,000} = 384.84 \text{ utils.}$$

IF Fred buys the insurance ...

$$W_g = 205,625 - \text{Prem} = 126,406.25$$

$$W_b = 100,000 - \text{Prem} + \text{Benefit} = 126,406.25$$

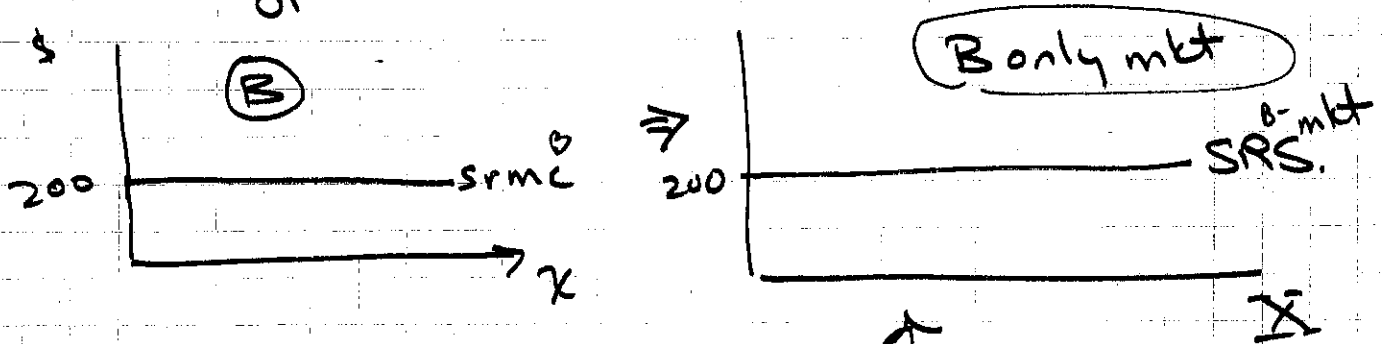
$$\Rightarrow EU^{\text{Fred}} = \sqrt{126406.25} = 355.54 \text{ utils.}$$

\Rightarrow Don't buy the insurance! $355.54 < 384.84$

The gadget market...

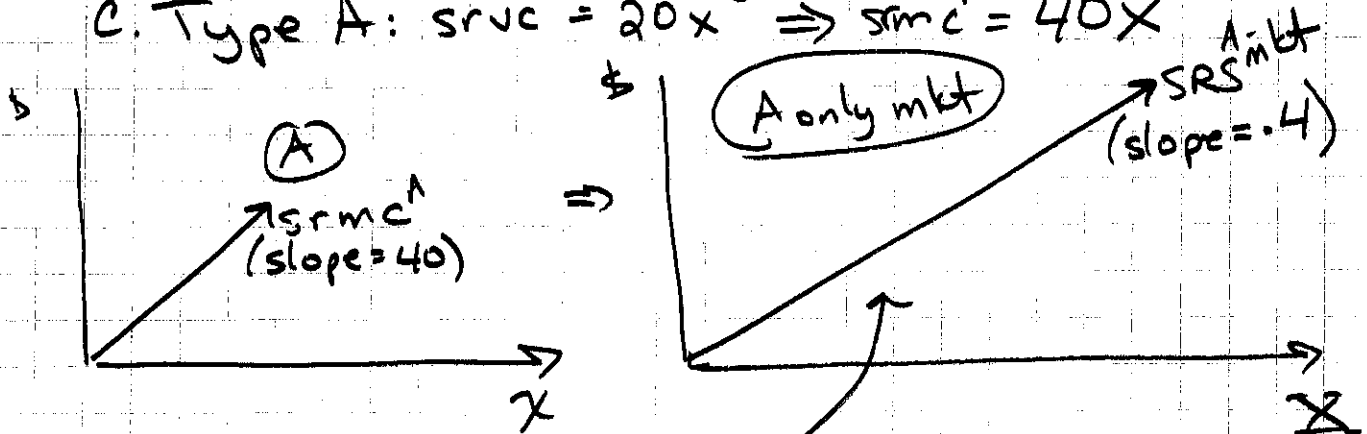
$$P^D = 1500 - X \quad \text{or} \quad X^D = 1500 - P$$

a. Type-B: $srvc^B = 200x \Rightarrow srmc^B = 200$



b. With only type-B get

c. Type A: $srvc = 20x^2 \Rightarrow srmc^A = 40x$



d. To get firm supply note: $srmc^A = 40x$,
firms set $mr = mc$ & for price takers,

$$p = mr \Rightarrow P^S = 40x \Rightarrow x^S = \frac{1}{40} P$$

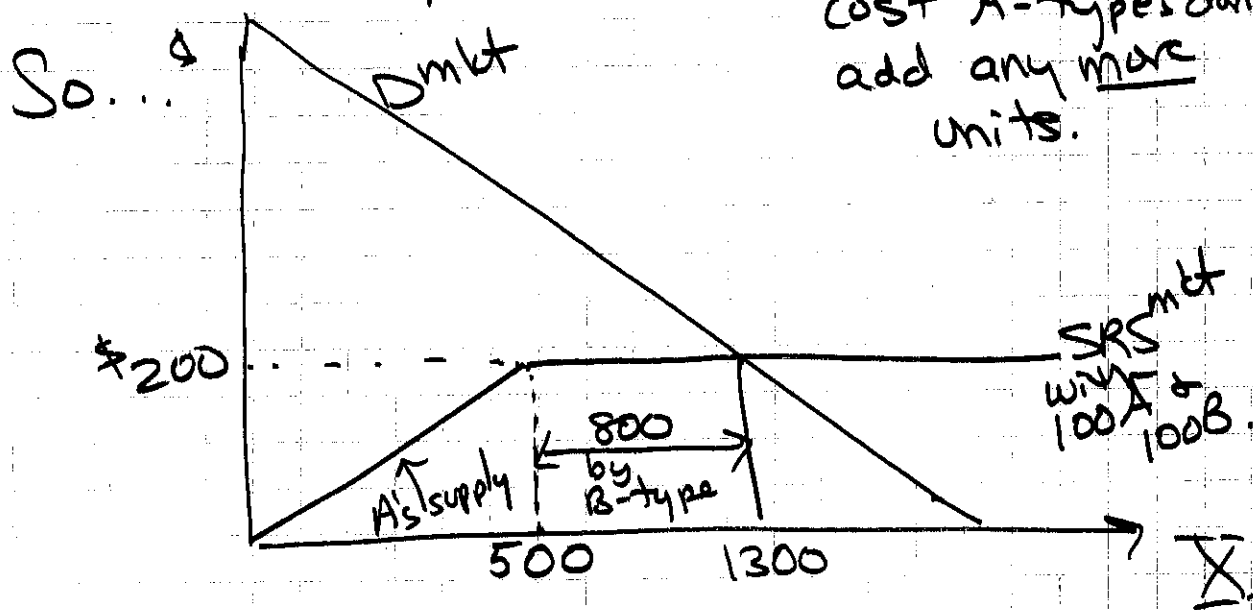
Now multiply $x^S = \frac{1}{40} P$ times 100 firms

$$\Rightarrow \bar{X}^S = \frac{100}{40} P = \frac{10}{4} P \Rightarrow \bar{X}^S = 2.5P$$

$$\Rightarrow P^S = \frac{1}{2.5} X$$

$$\Rightarrow P^S = .4X$$

e. Now add together... Note if $P < 200$ then there is none supplied by B-type firms. But once $P > 200$, then only B-type firms supply additional units, and higher cost A-types don't add any more units.



f. Now... add market demand and note that $P^* = \$200 \Rightarrow X^* = 1500 - 200 = 1300$

$$\Rightarrow \kappa \text{ for type A firm} = \frac{1}{40} P^* = \frac{200}{40} = 5$$

\Rightarrow Combined type A firms supply 500

\Rightarrow Combined type B firms supply 800

\Rightarrow Each type B firm supplies 8.

$$\begin{aligned} \Rightarrow \Pi \text{ type A firm} &= (\$200)(5) - 20(5)^2 - f_c \\ &= 500 - f_c \end{aligned}$$

$$\begin{aligned} \Rightarrow \Pi \text{ type B firm} &= (\$200)(8) - (200)(8) - f_c \\ &= -f_c \end{aligned}$$