Name:

E-mail: *@uiuc.edu*

All questions must be answered on this test form!
For each question you must show your work and (or) provide a clear argument.
Use the last two pages and the back of the form as scratch paper.

Question 1

(a) Lower risk types, i.e., healthier individuals will anyone sign up for insurance *B*.

Since insurance company *B* will attract the lower risk individuals from insurance *A*, profits of insurance *A* will decrease.

(b) What fundamental informational problem can cause some countries with higher health care expenditures to have a lower quality of care? Moral Hazard, i.e., doctors prescribing unnecessary test or procedures.

(c) List two ways how to lower the impact of the problem in (b).

Out of pocket expenses.

Doctors receiving salary that is independent of treatments ordered.

Monitoring claims by insurance company.

Question 2

(a) If everyone is insured then the average accident probability is 0.5. Hence,

the insurance premium is 200

(b) If the insurance company charges a rate of 300 Dollars, then the cutoff α is $\alpha = 1 - 0.05\sqrt{100} = 0.5$. Thus, all types $0.5 \leq \alpha \leq 1$ will be insured. Thus,

The average accident probability is 0.75

The insurance companies expected profit per costumer is 0

Question 3

(a) The trader's expected bonus when choosing investment 1 is **$0.018m\alpha$**, from investment 2 is **$0.16m\alpha$**, from investment 3 is **$0.24m\alpha$**

Therefore the trader will chose investment 3

(b) Now suppose that the trader receives a salary of 100, 000 Dollars. If his trading result in a negative return he pays a penalty of β times the amount of money lost.

Then the trader's expected payoff when choosing investment 1 is **$100,000$**, from investment 2 is **$100,000 - 0.01\beta m$**, from investment 3 is **$100,000 - 0.3\beta m$**

Therefore the trader will chose investment 1

(c) With investment 1, the chance of getting the highest return is 0. With investment 2 the probability is $0.8 \times 0.3 = 0.24$. With investment 3 the probability is $0.4 \times 0.8 = 0.32$.

Then the trader's expected bonus when choosing investment 1 is **0**, from investment 2 is **$240,000$**, from investment 3 is **320,000**

Therefore the trader will chose investment 2

Question 4 Note that $\text{MC}(Q) = 10Q$. Thus, $10Q = P$, i.e., $Q = 0.1P$ is the supply of a single firm. Since there are 100 firms, market supply is $Q_S(P) = 10P$. Demand is given by $Q_D(P) = 2,000 - 40P$. Then in equilibrium, $10P = 2,000 - 40P$, i.e., $50P = 2,000$.

$P = 40$, and $Q = 400$

Question 5 Since MC = 20, the firm will set $P = 20$. Thus, demand is $Q = 40$. The remaining surplus is 900, which is F. Revenue per person is 1,700, hence, 1,700,000 total. Total demand is 40,000. Hence, $C(Q) = 900,000$, and profits are 800,000.

The profit maximizing $F = 900$, $P = 20$

The firm's total profit (from all costumers) is 800,000

Question 6 Since MC = 0 the firm should choose $Q = 20$. If a type A consumers buys the product at the price of $P = 6$ per unit then $Q = 14$. The net-surplus is 98. The gross surplus from consuming 20 units is 200. Thus, $F = 200 - 98 = 102$.

The profit maximizing $F = 102$, $Q = 20$

The quantity discount increases the profit from each type A costumer by **$18**

Question 7 **(a)** Suppose that total demand for movie tickets by students is $Q_D^S(P) = 200 - 20P$, while total demand by non students is $Q_D^N(P) = 160 - 10P$. The movie theater's cost function is $C(Q) = 500$.

The price elasticities for students is $\epsilon^S = 20P/(20P - 200) = P/(P - 10)$. Thus, $0 = P(1 + (P - 10)/P) = P + P - 10$, i.e., $P = 5$. Hence, $Q = 100$.

The price elasticities for non students is $\epsilon^N = 10P/(10P - 160) = P/(P - 16)$. Thus, $0 = P(1 + (P - 16)/P) = P + P - 16$, i.e., $P = 8$. Hence, $Q = 80$.

Total revenue is therefore 1,140. Costs are 800. Therefore profits are 340.

$P^S = 5$, $P^N = 8$

The theater's profit is 340

Aggregate demand is $Q(P) = 360 - 30P$. The price elasticities is $\epsilon^S = 30P/(30P - 360) = P/(P - 30)$. Thus, $0 = P(1 + (P - 12)/P) = P + P - 12$, i.e., $P = 6$. Hence, $Q = 180$. Revenue is 1,080. Thus, profit is 280.

If, instead, the firm does not use price discrimination and charges the same price to students and non-students then

the profit maximizing price is $P = 6$

The theater's profit is 280

(b) When going from price discrimination to no price discrimination:

The net-benefit of all students is negative the area underneath $Q(P) = 200 - 20P$ between $P = 5$ and $P = 6$. Thus, net benefit **decreases** by **90**.

The net-benefit of non students is the area underneath $Q(P) = 160 - 10P$ between $P = 5$ and $P = 10$. Thus, net benefit **increases** by **320**.

The firm's profit decreases by 60. Thus, the total change in surplus is $-90 + 320 - 60 = 170$.

Thus, producer + consumer surplus **increases** by **170**.

Question 8 **(a)** Suppose there are two airlines A, B, offering service between two cities. Their cost functions are given by $C^A(Q) = 10,000 + 20Q$ and $C^B(Q) = 10,000 + 40Q$. Suppose that demand is given by $Q_D(P) = 1,050 - 10P$. Using the Oligopoly model determine the following:

The price elasticity of demand is $\epsilon = (P - 105)/P$. Thus, $20 = P(1 + s_1(P - 105)/P) = P + s_1(P - 105)$, and $40 = P(1 + s_2(P - 105)/P) = P + s_2(P - 105)$, Hence, $60 = 3P - 105$, i.e., $P = 55$. Thus, $s_1 = 0.7$ and $s_2 = 0.3$. Market demand at $P = 55$ is $Q = 500$. Thus, $Q_A = 350$ and $Q_B = 150$. Revenues are therefore 19,250 and 8,250, respectively. Hence, profits are 2,250 and $-7,750$.

The equilibrium price $P = 55$

The firms' market shares are $s_1 = 0.7$, $s_2 = 0.3$

***A*'s profit is 2,250, *B*'s profit is $-7,750$**

(b) If airline B stops offering service on the route then $20 = P(1 + (P - 105)/P) = 2P - 105$. Thus, $P = 62.50$. Hence, $Q = 425$. Hence, revenue is 26,562.50 and profits are 8062.50.

The equilibrium price $P = 62.50$, and $Q = 425$

***A*'s profit is 8062.50**

(c) Determine the change in consumer surplus when moving from (a) to (b).

The change in surplus is given by the area underneath $Q(P) = 1,050 - 10P$ between $P = 55$ and $P = 62.50$, which is 3,468.75

Consumer surplus **decreases** by **3,468.75**.

Total firm profits in the oligopoly case are $2,250 - 7,750 = -5,500$ and 8062.50 in the monopoly case. The net-change is therefore 13,562.50. Thus, consumer + producer surplus **increases** by **10,093.75**.

Not graded: Use as Scratch Paper

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