KEY

1. The DELL Corporation, determines that in 2011 the demand curve for its business laptop is

$$P = 8000 - 50Q \qquad or \qquad Q = \frac{8000}{50} - \frac{1}{50}P$$

where P is the price (in dollars) of a business laptop and Q is the number of laptops sold per month.

a. (5 pts.) To sell 80 laptops per month, what price would DELL have to charge?

$P = 8000 - 50(80) = \$4000$

b. (5 pts.) If managers set a price of $1,500, how many laptops will DELL sell per month?

$Q = \frac{8000}{50} - \frac{1}{50}(1500) =$

$Q = 160 - 30 = 130$

c. (5 pts.) If DELL wants to maximize revenue, what price should it charge and what is elasticity of demand at that price?

$MR = 8000 - 100Q = 0 \rightarrow Q = 80 \rightarrow$ **$P = \$4000$**

$\eta = -1$ at Rev Max Price

d. (5 pts.) Would DELL charge the revenue maximizing price? Explain why or why not.

Only if $MC = 0$ since firms max profit not revenue and profit is max when $MR = MC$.

KEY

2. Fender sells great guitars. One of Fender's major products is a standard Stratocaster guitar that costs the company $200 per guitar to buy (including transportation and other related costs). An economist estimated the elasticity of demand for this product to be -1.3. Fender currently charges $800 per guitar.

   a. (5 pts.) What is their current markup on guitars?

$C = \$200$

$\eta = -1.3$

$P = \$800$

$$M = \frac{P-C}{C} = \frac{800-200}{200} = \frac{600}{200} = 3 \text{ or } 300\% \text{ markup}$$

   b. (5 pts.) What should their markup be?

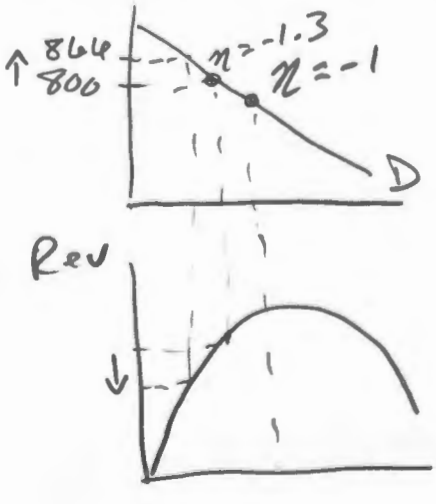
$$M = \frac{1}{|\eta|-1} = \frac{1}{1.3-1} = \frac{1}{.3} = 3.33 \text{ or } 333\%$$

   c. (5 pts.) Should they raise their price or lower their price? (Be sure to state the price they should charge).

They should raise their price.

$$P = C(1+M) = 200(1+3.33) = 200(4.33) = \$866$$

   d. (5 pts.) Based on your answer and the elasticity, what should happen to Fender's revenue? Explain.



Revenue should decline since we are raising price on the elastic portion of the Demand curve.

3. The local oil change shop, Jiffy Oil, offers oil changes in a CT market where there are two types of consumers: "rich" (denoted, "r") and "average income" (denoted "a for "average"). An economic consultant estimates that the price elasticity for oil changes for the rich consumers is -1.2 but for the average income consumers it is -1.25. The oil change costs $10 per oil change and sells for a price of P (dollars per oil change).

$\eta_r = -1.2$

$\eta_a = -1.25$

$C = \$10$

   a. (5 pts.) If the Company only sold to "rich" types, what markup and price would they use?

$$P_r = MC\left(\frac{\eta_r}{1+\eta_r}\right) = 10\left(\frac{-1.2}{1-1.2}\right) = 10\left(\frac{-1.2}{-.2}\right) = 10\left(\frac{1.2}{.2}\right)$$

$$\boxed{P_r = \$60}$$

   b. (5 pts.) If the Company only sold to "average income" types, what markup and price would they use?

$$P_a = MC\left(\frac{\eta_a}{1+\eta_a}\right) = 10\left(\frac{-1.25}{-.25}\right) = 10\left(\frac{1.25}{.25}\right)$$

$$\boxed{P_a = \$50}$$

   c. (5 pts.) Suppose the Company decides to run coupons in the paper for $X off the sales price on the belief that only "average income" types would clip and use such coupons. How much should the coupon be for?

$$X = P_r - P_a \rightarrow \boxed{X = \$10}$$

KEY

4. Pharmaceutical drugs sell worldwide at very different prices. Consider a company, Drugs-R-US, that sells a medication in Latin America, Europe, and the United States. Transportation costs are a negligible proportion of the product's total costs. The price elasticity of demand for the medication is -5.0 in Latin America, -2.0 in the United States, and -1.5 in Europe. Because of legal limitations, this medication, once sold to a customer in one country, cannot be resold to a buyer in another country.

$\eta_{LA} = -5$
$\eta_{US} = -2$
$\eta_{EU} = -1.5$

a. (10 pts.) The medication currently sells for \$50 in Latin America, \$100 in the US, and \$150 in Europe. Suppose the price in the US is the "correct" price. Are the other prices optimal? If yes, explain. If no, explain and show what prices they should be charging.

$P_{LA} = \$50$
$P_{US} = \$100$
$P_{EU} = \$150$

Optimal Pricing Requires $MC = MR_{LA} = MR_{US} = MR_{EU}$

So $P_{LA}\left(\frac{1+\eta_{LA}}{\eta_{LA}}\right) = P_{US}\left(\frac{1+\eta_{US}}{\eta_{US}}\right)$

$P_{LA} = P_{US}\left(\frac{1+\eta_{US}}{\eta_{US}}\right)\left(\frac{\eta_{LA}}{1+\eta_{LA}}\right) = P_{US}\left(\frac{-1}{-2}\right)\left(\frac{-5}{-4}\right) = P_{US}(.625)$

$P_{LA} = 100(.625) = \$62.5$

NO $P = 50$ is not optimal

More Space

b. (5 pts.) Can you be sure that managers are maximizing profit? Why or why not?

Since $P_{LA} = \$50 < P_{LA} = \$62.5$ which is optimal we know they were definitely not max π.

$P_{EU} = 100(.5)\left(\frac{-1.5}{-.5}\right)$

$P_{EU} = \$150$ ok

Even if $P_{LA} = \$62.5$, $P_{US} = \$100$ & $P_{EU} = \$150$, we only know $MR_{LA} = MR_{US} = MR_{EU}$ but not if $MR = MC$. So we still don't know if these are π-max prices.

c. (5 pts.) What ~~might~~ will happen if the legal restrictions on trading medication are eliminated. Explain the implications for the Drugs-R-Us's pricing policy.

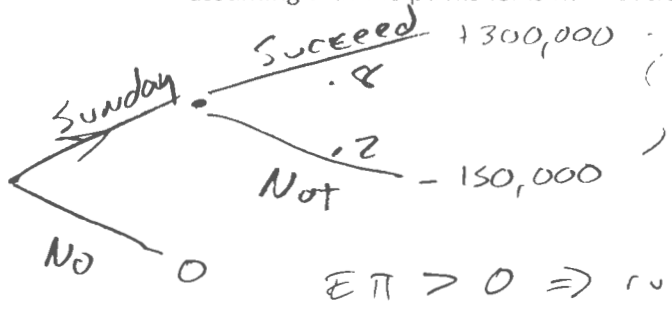
To effectively price differentiate, the firm must be able to prevent customers of different types from trading with each other.

In this case people would buy in LA & sell in EU until the $\uparrow P_{LA}$ & $\downarrow P_{EU}$.

Their pricing policy would collapse until they charged more consistent prices, differing only by taxation and transportation costs.

KEY

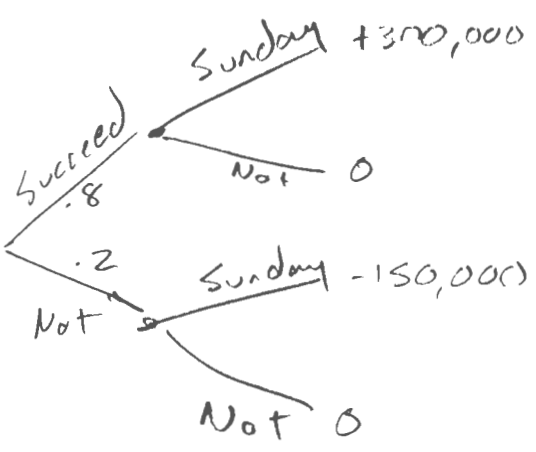
5. A newspaper publisher in a small town must decide whether or not to publish a Sunday edition. The publisher thinks that the probability is 0.8 that a Sunday edition would be a success and 0.2 that it would be a failure. If it is a success, he will gain $300,000. If it is a failure, he will lose $150,000.
   a. (5 pts.) Construct the decision tree for this problem, and use it to solve the problem, assuming that the publisher is risk neutral.



$E\pi = .8(300,000) - .2(150,000) = \$210,000$

$E\pi > 0 \Rightarrow$ run Sunday edition.

   b. (5 pts.) What is the expected value of perfect information?



$E\pi^* = .8(300,000) + .2(0) = \$240,000$

$Pay \leq E\pi^* - E\pi$

$\leq 240,000 - 210,000$

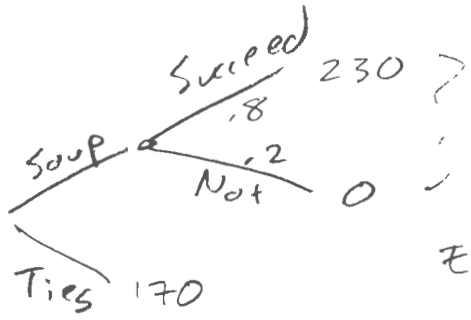
$Pay \leq \$30,000$

6. Vinny is considering investing money in "Vinny's Suits and Ties" or in "Vinny's Hot Soup Stand". Vinny currently has $100,000. To avoid negative numbers, we'll always assume Vinny gets his $100,000 back at the end of the year. Also, let *M* be Vinny's total amount of money *in thousands* at the end of the year.
   Vinny currently has the $100,000 in his suit and tie business and will earn $70,000 for sure by the end of the year (i.e., M = $100 + $70 = $170). Alternatively, Vinny could invest his $100,000 in opening his hot soup stand on the street in Budapest. If he does, he estimates there is an 80% chance that he'll succeed and earn $130,000 (i.e., M = $100 + $130 = $230) and a 20% chance he'll lose $100,000 (i.e., M = $100 - $100 = 0).

(Parts a – c on the next page)

KEY

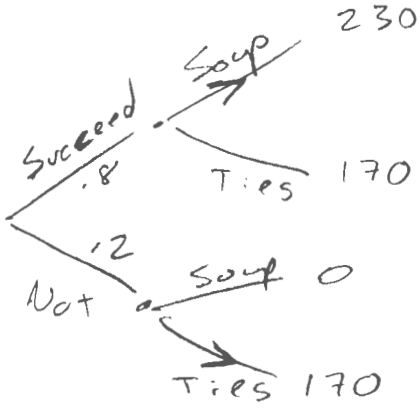
a. (5 pts.) Assume Vinny is risk neutral. Should he invest in Hot Soups? (Be sure to draw clearly the decision tree and use it to solve the problem).



$E\Pi = .8(230) = \$184$

$E\Pi > 170 \Rightarrow$ Invest in Hot Soups

b. (5 pts.) Assume Vinny is risk neutral. If Chris Consulting could sell him perfect information, what is the maximum he would pay? (Again, be sure to draw clearly the decision tree and use it to solve the problem).

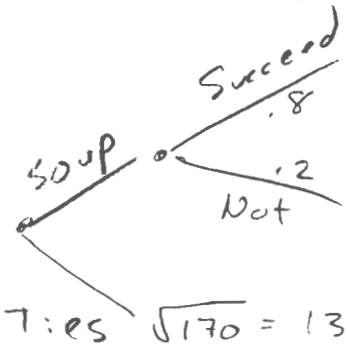


$E\Pi^* = .8(230) + .2(170) = \$218$

$\text{Pay} \leq E\Pi^* - E\Pi = 218 - 170$

$\boxed{\text{Pay} \leq \$48{,}000}$

c. (5 pts.) Would your answer for part (a) change if Vinny were risk averse with utility, $U = \sqrt{M}$?



$\sqrt{230} = 15.17$ $\quad EU = .8(15.17) = 12.14$

$\sqrt{0} = 0$

$\sqrt{170} = 13.04$

$EU < 13.04 \Rightarrow$ Do Not Invest in Hot Soups.

KEY

NAME: _____

Equations to remember:

$$Markup = \frac{(Price - Cost)}{Cost}$$

$$Price = Cost(1 + Markup)$$

$$Markup = \frac{1}{|\eta| - 1}$$

$$\eta = \frac{dQ}{dP}\left(\frac{P}{Q}\right)$$

$$P = MC\left(\frac{\eta}{1+\eta}\right)$$

$$MC = P\left(\frac{1+\eta}{\eta}\right)$$