You are allowed one 3x5 index card on which you can write anything you want for the midterm.

Homework Questions

1) El Niño wind patterns affected the weather across the United States during the winter of 1997–1998. Suppose the demand for home heating oil in Connecticut is given by $Q = 20 - 2P_{hho} + 0.5P_{ng} -$ TEMP, where Q is the quantity of home heating oil demanded, P_{hho} is the price of home heating oil per unit, P_{ng} is the price of natural gas per unit, and TEMP is the absolute difference between the average winter temperature over the past 10 years and the current average winter temperature. If the current price of home heating oil is $1.20, the current price of natural gas is $2.00, and the average winter temperature this year is 40 degrees compared to 28 degrees over the past 10 years.

A. What is the quantity of home heating oil demanded? 6.6 units

B. How much did change in winter temperature effect demand in comparison to the average winter temperature? 12 units

C. What is the estimated price elasticity of demand for home heating oil? $|(-2)\ P_{hho}/Q| = 2\ (1.2/6.6)=0.364$

D. If the sellers of home heating oil are profit maximizers, how should price be adjusted?

From the information we have we cannot determine is price should be changed. Point Price Elasticity is less than 1 in absolute value so revenues can be increased by raising price. Therefore the company might want to experiment with raising the price.

2) The accompanying table describes Ben's preferences over cake and ice cream. The utility from consumption of one good is independent of the consumption of the other. The price of cake is $10 per unit, and the price of ice cream is $4 per unit. MU stands for Marginal Utility

Units Consumed	*MU* Cake	*MU* Ice Cream
1	80	20
2	60	19
3	40	18
4	20	17
5	15	16

a. If Ben has $50 to spend, the optimal combination of these goods is? 3 cakes, 5 ice cream
b. Ben's total utility at this optimal consumption bundle will be? 270 utils
c. Now suppose Ben has $70 to spend. How do the answers to question a & b above change? It does not tell us how much utility Ben get from extra ice cream. If we assume it is zero, then the combination will be 5 and 5, and total utility will be 305.

3.) A regression of exports as a function of imports in 1991 across industry types yielded

exports = 68 – 0.3(imports), R^2 = .25, Prob > F = .26, F-critical =2.91

a. If imports by an industry equal 60, what is the estimate of exports from this industry? 50

b. How confident are you of your estimate? Explain. Not Very. The F-statistic is far below the critical value which means the coefficient are not jointly significant and since there is only one coefficient it will

not be significantly significant. In addition the R-squared is fairly low and only explains 25% of the variation in exports.

c. How much of the variation is explained by the regression? 25%

4) According to data obtained by the U.S. Department of Agriculture, the relationship between a cow's total output of milk and the amount of grain it is fed is as follows:

Amount of Grain (Pounds)	Amount of Milk (Pounds)
1,200	5,917
1,800	7,250
2,400	8,379
3,000	9,371

(This relationship assumes that forage input is fixed at 6,500 pounds of hay.)

a. Calculate the average product of grain when each amount is used.
b. Estimate the marginal product of grain when between 1,200 and 1,800 pounds are fed, when between 1,800 and 2,400 pounds are fed, and when between 2,400 and 3,000 pounds are fed.
c. Does this production function exhibit diminishing marginal returns?

SOLUTION:

a. and b. are given in the following table.

G	Average product Q/G	Marginal product $\Delta Q/\Delta G$
1,200	5,917/1,200 = 4.93	1,333/600 = 2.22
1,800	7,250/1,800 = 4.03	1,129/600 = 1.88
2,400	8,379/2,400 = 3.49	992/600 = 1.65
3,000	9,371/3,000 = 3.12	

c. Yes, we can see that succeeding 600-pound increments of grain increase milk production by successively smaller amounts. That is, marginal product is decreasing.