

### **PRACTICE EXERCISES FOR CHAPTER 5**

The exercises below are designed to facilitate your understanding of the mathematical and graphical concepts relevant to Chapter 5. Use your lecture notes and textbook to complete the problems and THEN “grade” yourself using my solutions, which are provided on the last few pages of this packet. **Remember, completing this exercise set is only a PART of the exam preparation process in this course!**

1. David really likes iced tea. He gets 50 utils of satisfaction from the first glass of iced tea, 35 utils of satisfaction from the second glass of iced tea, and a total satisfaction of 110 utils when he drinks a total of three glasses of iced tea. How much marginal utility does David get from the third glass of iced tea? How much total utility does David get if he drinks only two glasses of iced tea?

2. Daria really likes ice cream. She gets 40 utils of satisfaction from the first ice cream cone, 35 utils of satisfaction from the second ice cream cone, 25 utils of satisfaction from the third ice cream cone, and a total satisfaction of 120 utils when she consumes a total of four ice cream cones. How much marginal utility does Daria get from the fourth ice cream cone? How much total utility does Daria get if she only consumes three ice cream cones? If she consumes only two?

Use this table to answer questions 3 - 7.

Information reflecting a consumer's preferences for cans of soda pop per day

# of sodas	Total Utility (in utils)	Marginal Utility (in utils)
0	0	NA
1	8	
2	18	
3	30	
4	37	
5	41	
6	43	
7	43	
8	40	

3. Fill in the blanks in the table above.

4. Increasing marginal utility exists for sodas \_\_\_\_\_ through \_\_\_\_\_.

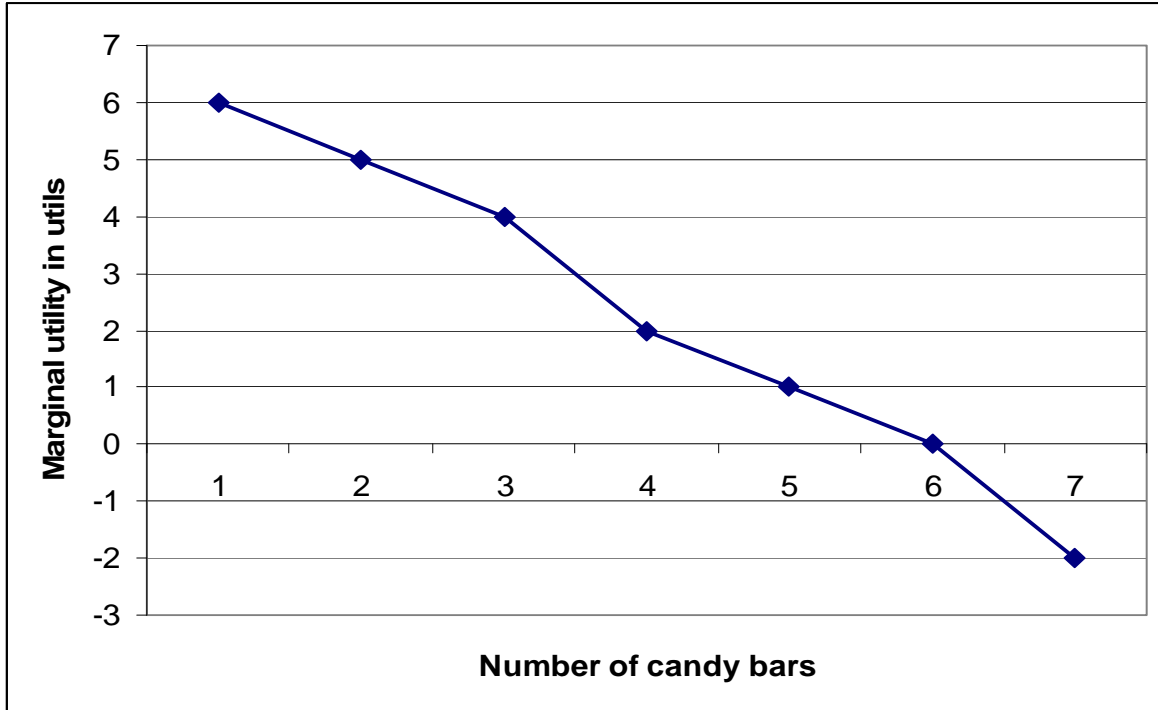
5. Diminishing marginal utility exists for sodas \_\_\_\_\_ through \_\_\_\_\_.

6. Negative marginal utility occurs with the consumption of soda \_\_\_\_\_.

7. Total utility is maximized when you consume \_\_\_\_\_ sodas per day.

Use this graph of a consumer's MARGINAL UTILITY CURVE to answer questions 8 - 14.

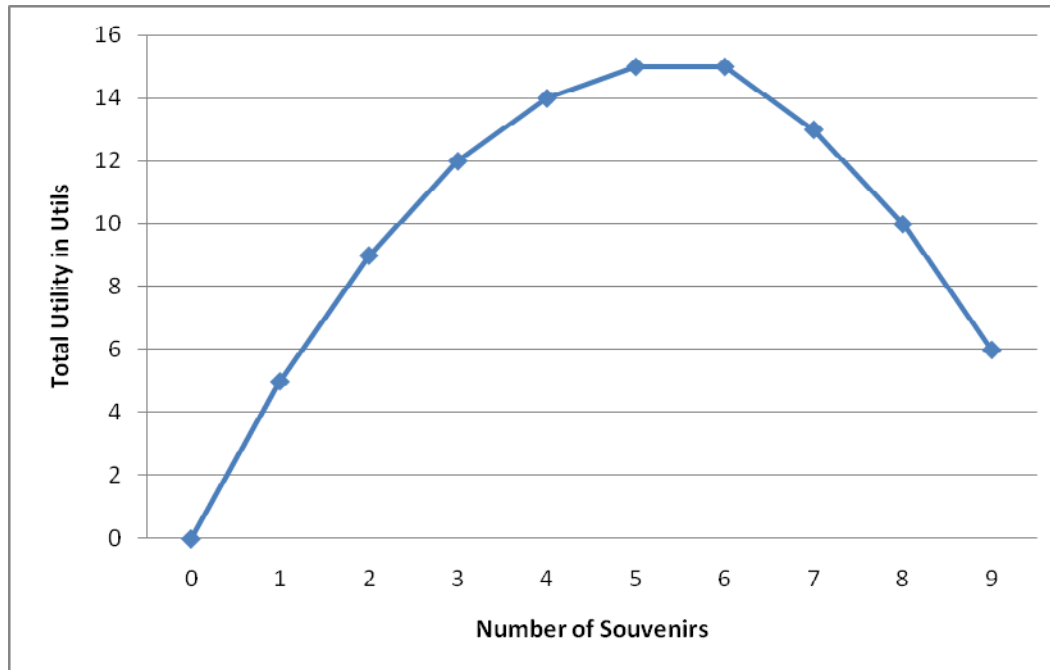
Pay special attention to what's illustrated on the graph AND what the question asks about!



8. The marginal utility from the first candy bar is \_\_\_\_\_.
9. The marginal utility from the third candy bar is \_\_\_\_\_.
10. The total utility from consuming 2 candy bars is \_\_\_\_\_.
11. The total utility from consuming 4 candy bars is \_\_\_\_\_.
12. Total utility is maximized when you consume \_\_\_\_\_ candy bars.
13. Diminishing marginal utility sets in with the consumption of the \_\_\_\_\_ candy bar.
14. Marginal utility becomes negative with the consumption of the \_\_\_\_\_ candy bar.

Use this graph of a consumer's TOTAL UTILITY CURVE to answer questions 15 - 21.

Pay special attention to what's illustrated on the graph AND what the question asks about!



15. The marginal utility from the first souvenir is \_\_\_\_\_.
16. The marginal utility from the third souvenir is \_\_\_\_\_.
17. The total utility from receiving 4 souvenirs is \_\_\_\_\_.
18. The total utility from receiving 8 souvenirs is \_\_\_\_\_.
19. Total utility is maximized when you receive \_\_\_\_\_ souvenirs.
20. Diminishing marginal utility sets in with the receipt of the \_\_\_\_\_ souvenir.
21. Marginal utility becomes negative with the purchase of the \_\_\_\_\_ souvenir.

**\*\* See the Utility Maximization Rule on page 106 \*\***

22. Chris has an income of \$50 that he is spending on crackers and cheese in such amounts that he derives 25 utils of satisfaction from the last cracker consumed and 25 utils of satisfaction from the last slice of cheese consumed. The price of a cracker is \$0.25 and the price of a slice of cheese is \$0.50. Is Chris currently consuming a combination of cheese and crackers that maximizes his TOTAL UTILITY? If not, what changes should he make in his consumption patterns to get closer to the utility maximizing combination?

23. Valarie has an income of \$15 that she is spending on pizza and beer in such amounts that she derives 20 utils of satisfaction from the last slice of pizza consumed and 30 utils of satisfaction from the last mug of beer consumed. The price of a pizza slice is \$2.00 and the price of a mug of beer is \$3.00. Is Valarie currently consuming a combination of pizza and beer that maximizes her TOTAL UTILITY? If not, what changes should she make in her consumption patterns to get closer to the utility maximizing combination?

24. Tracey has an income of \$30 that she is spending on lipstick and mascara in such amounts that she derives 35 utils of satisfaction from the last tube of lipstick purchased and 20 utils of satisfaction from the last tube of mascara purchased. The price of tube of lipstick is \$7.00 and the price of a tube of mascara is \$2.00. Is Tracey currently consuming a combination of lipstick and mascara that maximizes her TOTAL UTILITY? If not, what changes should she make in her purchasing patterns to get closer to the utility maximizing combination?

25. When the price of pizza is \$10 per pie, Tallahassee consumers purchase 5,000 pizzas per week. When the price of pizza falls to \$6 per pie, Tallahassee consumers purchase 10,000 pizzas per week. Compute the elasticity of demand for pizza. How would you classify the  $E_D$  of pizza?

26. When the price of roses is \$25 per dozen, 30 dozen roses are purchased per day. When the price of roses rises to \$40 per dozen, only 27 dozen are purchased per day. Compute the elasticity of demand for roses. How would you classify the  $E_D$  of roses?

27. When the price of HDTVs is \$8000, 30 such televisions are purchased per month. When the price of HDTVs falls to \$2000, 90 such televisions are purchased per month. Compute the elasticity of demand for HDTVs. How would you classify the  $E_D$  of HDTVs?

28. When sneakers are priced at \$50 per pair, 150 pairs are purchased per week. When the price of sneakers rises to \$90 per pair, only 120 pairs are purchased per week. Compute the elasticity of demand for sneakers. How would you classify the  $E_D$  of sneakers?

29. When birthday cakes are priced at \$20 each, 80 cakes are purchased per week. When the price of birthday cakes falls to \$15 per cake, the quantity purchased increases to 100 cakes per week. Compute the elasticity of demand for birthday cake. How would you classify the  $E_D$  of birthday cake?

30. When the price of calendars increases by 25%, the quantity purchased falls by 15%. You would classify the  $E_D$  for calendars as \_\_\_\_\_ (elastic, inelastic).

31. When the price of beer increases by 10%, the quantity purchased falls by 50%. You would classify the  $E_D$  for beer as \_\_\_\_\_ (elastic, inelastic).

32. When the price of nail polish decreases by 30%, the quantity purchased increases by 20%. You would classify the  $E_D$  for nail polish as \_\_\_\_\_ (elastic, inelastic).

33. When the price of paper decreases by 10%, the quantity purchased increases by 15%. You would classify the  $E_D$  for paper as \_\_\_\_\_ (elastic, inelastic).

34. The elasticity of demand for pizza is 3.0. If Pizza Hut runs a special that lowers the price of pizza by 10%, will their pizza sales increase or decrease? By what percentage?

35. The elasticity of demand for cookies is 0.50. If Nabisco raises cookie prices 20%, will their cookie sales increase or decrease? By what percentage?

36. The elasticity of demand for orange juice is 1.5. If Tropicana raises the price of their half-gallon orange juice cartons by 30%, will their juice sales increase or decrease? By what percentage?

37. The elasticity of demand for health insurance is 0.60. If Capital Health Plan raises monthly premium rates by 10%, will their health insurance sales increase or decrease? By what percentage?

Assume an economist employed by McDonalds has determined that the elasticity of demand for Big Mac sandwiches is 4.5. A Big Mac sandwich currently sells at a price of \$1.39 and McDonalds is able to sell 15,000 sandwiches per week in Tallahassee at this price.

38. How would you classify the  $E_D$  for Big Mac sandwiches?
39. How much total revenue per week is earned by McDonalds in Tallahassee?
40. Assuming McDonalds faces per sandwich production costs of \$0.30, how much weekly cost does McDonalds incur in the production of Big Macs in the Tallahassee market?
41. How much weekly profit does McDonalds earn from its Tallahassee sales?
42. McDonalds is contemplating lowering the price of a Big Mac by 20%. What would be the new selling price for a Big Mac?
43. Will the weekly sales of McDonalds INCREASE or DECREASE as a result of this price change?
44. By what percentage? (HINT: Use your formula. Ask yourself: “What parts of the formula do I have and what part do I need?”)
45. After this price change, how many Big Mac sandwiches will McDonalds sell per week in Tallahassee?
46. How much total revenue per week will McDonalds now earn in Tallahassee?
47. Assuming McDonalds faces per sandwich production costs of \$0.30, how much weekly cost does McDonalds now incur in the Tallahassee market?
48. How much weekly profit would McDonalds now earn from its Tallahassee sales?
49. So, would this price cut be a desirable strategy for the company to pursue?

Assume an economist employed by Goodyear has determined that the elasticity of demand for its new tires is 0.50. A single new tire currently sells at a price of \$100.00 and Goodyear is able to sell 400 new tires per week in Tallahassee at this price.

50. How would you classify the  $E_D$  for Goodyear's new tires?
51. How much total revenue per week is earned by Goodyear in Tallahassee?
52. Assuming Goodyear faces per tire production costs of \$12.00, how much weekly cost does Goodyear incur in the production of new tires for the Tallahassee market?
53. How much weekly profit does Goodyear earn from its Tallahassee sales?
54. Goodyear is contemplating lowering the price of a new tire by 25%. What would be the new selling price for a new Goodyear tire?
55. Will the weekly sales of Goodyear INCREASE or DECREASE as a result of this price change?
56. By what percentage? (HINT: Use your formula. Ask yourself: "What parts of the formula do I have and what part do I need?")
57. After this price change, how many new tires will Goodyear sell per week in Tallahassee?
58. How much total revenue per week will Goodyear now earn in Tallahassee?
59. Assuming Goodyear faces per tire production costs of \$12.00, how much weekly cost does Goodyear now incur for the Tallahassee market?
60. How much weekly profit would Goodyear now earn from its Tallahassee sales?
61. So, would this price cut be a desirable strategy for the company to pursue?

Larry is the proprietor of Larry's Lawn Service. He currently charges \$50 to mow a customer's lawn. He currently has 80 regular customers that he serves every two weeks. Larry has estimated the Elasticity of Demand for his lawn service to be 3.00.

62. Compute Larry's Total (Sales) Revenue for each two-week time period.

63. If Larry incurs an average cost of \$15 to mow each lawn (gasoline for his equipment, wage payments to his helper, etc), how much Total Cost does Larry incur for each two-week time period?

64. How much Total Profit does Larry earn per two-week time period?

65. Larry has decided to lower the price of his lawn service to \$40 per lawn. How many customers will Larry now service per two-week time period?

66. Compute Larry's New Total (Sales) Revenue for each two-week time period.

67. Assuming his average cost remain unchanged at \$15 per lawn, how much Total Cost does Larry NOW incur?

68. How much Total Profit does Larry earn NOW?

69. So, does it seem like lowering price was a "smart business decision" for Larry?

Carl is the proprietor of Carl's College Textbook Store. His "Introduction to Economics" textbooks are currently priced at \$150 each and he sells 500 per semester. Carl has estimated the Elasticity of Demand for these particular textbooks to be 0.25.

70. Compute Carl's Total (Sales) Revenue for each semester.

71. If Carl pays the textbook publisher \$40 for each of these textbooks, how much Total Cost does Carl incur per semester?

72. How much Total Profit does Carl earn per semester from these textbooks?

73. Carl has decided to lower the price of the "Introduction to Economics" textbooks to \$120 each. How many of these textbooks can Carl NOW expect to sell each semester?

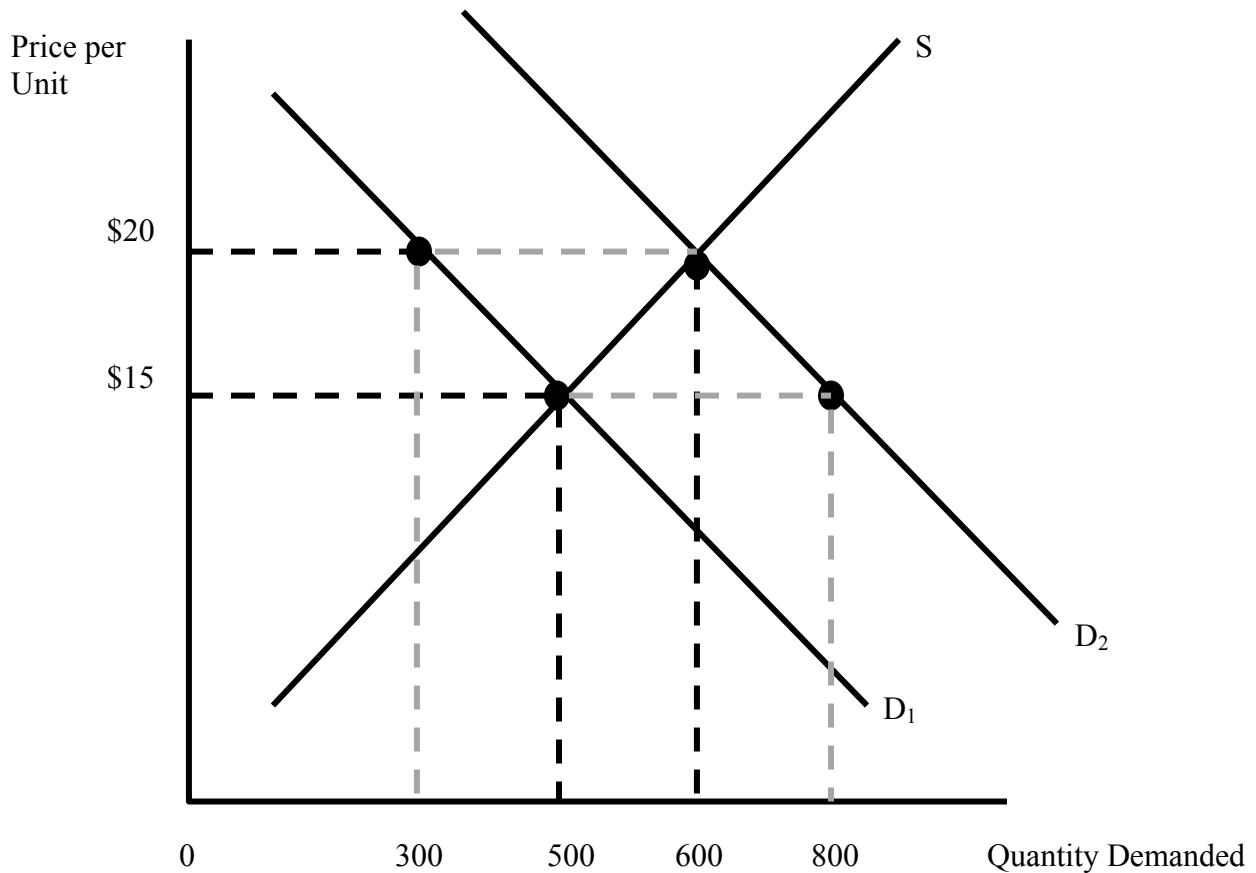
74. Compute Carl's New Total (Sales) Revenue for each semester.

75. Assuming his payment to the textbook publisher remains unchanged at \$40 per textbook, how much Total Cost does Carl NOW incur?

76. How much Total Profit does Carl earn NOW?

77. So, does it seem like lowering price was a "smart business decision" for Carl?

Suppose that DeWalt used to sell 500 power screwdrivers at a price of \$15 each. Thanks to a new advertising campaign (sponsoring the #17 Ford Fusion of Matt Kenseth in the NASCAR Sprint Cup Series), the demand for their power screwdrivers has increased to  $D_2$ . DeWalt is now able to sell 600 power screwdrivers at a price of \$20 each.



78. Along Demand curve  $D_1$  (the original demand curve), compute the Elasticity of Demand for the power screwdriver between the prices of \$15 and \$20.

79. Along Demand curve  $D_2$  (the post-advertising demand curve), compute the Elasticity of Demand for the power screwdriver between the prices of \$15 and \$20.

80. So, you can now conclude that advertising does TWO THINGS for a firm: It INCREASES the demand for your product AND it causes the ELASTICITY of demand for your product to become MORE \_\_\_\_\_.

Suppose the US Federal Government decides to levy a new tax on a product in order to RAISE ADDITIONAL REVENUES to help balance the annual budget. The Congressional Budget Office (CBO) has suggested placing a new \$1.00 tax on gasoline, which has an Elasticity Coefficient of 0.25. The Office of Management and Budget (OMB) has suggested placing a new \$1.00 tax on milk, which has an Elasticity Coefficient of 2.50. Americans currently purchase and consume 400 million gallons of BOTH gasoline and milk per day. The current selling price of BOTH a gallon of gasoline and a gallon of milk is \$4.00.

81. In percentage terms, the new \$1.00 tax will increase the price of gasoline by \_\_\_\_\_.

82. In response to the new tax, the quantity of gasoline purchased will \_\_\_\_\_ (increase, decrease) by \_\_\_\_\_ %.

83. How much TAX REVENUE will the federal government bring in as a result of the new tax on gasoline?

84. In percentage terms, the new \$1.00 tax will increase the price of milk by \_\_\_\_\_.

85. In response to the new tax, the quantity of milk purchased will \_\_\_\_\_ (increase, decrease) by \_\_\_\_\_ %.

86. How much TAX REVENUE will the federal government bring in as a result of the new tax on milk?

87. Since the stated goal of the new tax is to RAISE ADDITIONAL REVENUES to help balance the annual budget, which tax would YOU recommend adopting?

Suppose the US Federal Government decides to levy a new tax on a product in order to REDUCE UNDESIRABLE BEHAVIOR on the part of citizens. Through a series of consumer surveys, the Federal Government has determined that the moral decline in this country can be primarily attributed to the general public's smoking of cigarettes and viewing of pornographic material. The government is considering placing a new \$2.00 per pack tax on cigarettes, which has an Elasticity Coefficient of 0.50. The government is also considering placing a new \$2.00 per unit tax on pornographic magazines (like *Playboy* or *Hustler*), which have an Elasticity Coefficient of 3.00. A pack of cigarettes currently sells for \$5.00 and a pornographic magazine currently sells for \$10.00.

88. In percentage terms, the new \$2.00 tax will increase the price of cigarettes by \_\_\_\_\_.

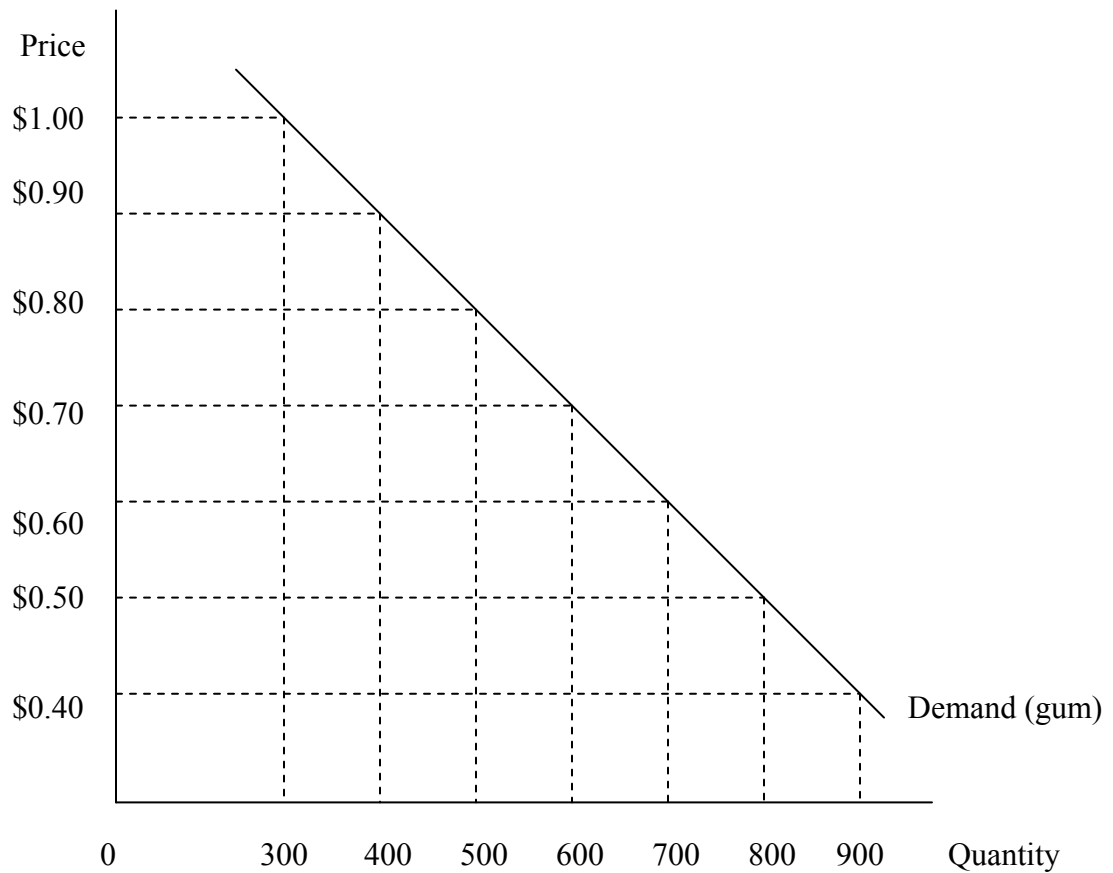
89. In response to the new tax, the quantity of cigarettes purchased will \_\_\_\_\_ (increase, decrease) by \_\_\_\_\_ %.

90. In percentage terms, the new \$2.00 tax will increase the price of pornographic magazines by \_\_\_\_\_.

91. In response to the new tax, the quantity of pornographic magazines purchased will \_\_\_\_\_ (increase, decrease) by \_\_\_\_\_ %.

92. Since the stated goal of the new tax is to REDUCE UNDESIRABLE BEHAVIOR on the part of citizens, which tax would YOU recommend adopting?

Use this graph of the demand curve for bubble gum to answer questions 93 – 99 below.



93. Compute  $E_D$  between \$1.00 (old price) and \$0.90 (new price). How would you classify  $E_D$ ?

94. Compute  $E_D$  between \$0.90 (old price) and \$0.80 (new price). How would you classify  $E_D$ ?

95. Compute  $E_D$  between \$0.80 (old price) and \$0.70 (new price). How would you classify  $E_D$ ?

96. Compute  $E_D$  between \$0.70 (old price) and \$0.60 (new price). How would you classify  $E_D$ ?

97. Compute  $E_D$  between \$0.60 (old price) and \$0.50 (new price). How would you classify  $E_D$ ?

98. Compute  $E_D$  between \$0.50 (old price) and \$0.40 (new price). How would you classify  $E_D$ ?

99. So, what interesting fact have you “proven” regarding the price elasticity of demand for a given product?

**MY SOLUTIONS**

(1) David gets 25 utils of satisfaction from drinking the third glass of tea. David would get only 85 utils of total satisfaction from consuming a total of two glasses of tea.

(2) Daria gets 20 utils of satisfaction from consuming the fourth ice cream cone. Daria would get 100 utils of total utility from consuming three ice cream cones. Daria would get 75 utils of total utility from consuming two ice cream cones.

(3) 8 utils, 10 utils, 12 utils, 7 utils, 4 utils, 2 utils, 0 utils, -3 utils

(4) One, Three

(5) Four, Eight

(6) Eighth

(7) Seven

(8) 6 utils

(9) 4 utils

(10) 11 utils

(11) 17 utils

(12) Six

(13) Second

(14) Seventh

(15) 5 utils

(16) 3 utils

(17) 14 utils

(18) 10 utils

(19) Six

(20) Second

(21) Seventh

(22) Chris is NOT currently maximizing his total utility. I know this because the marginal utility per dollar spent IS NOT EQUAL across goods. Chris is currently getting 100 utils of MU for each dollar spent on crackers and 50 utils of MU for each dollar spent on cheese. In order to move closer to utility maximization, Chris needs to spend more of his limited income on crackers and less of his limited income on cheese.

(23) Valarie IS currently maximizing her total utility. I know this because the marginal utility per dollar spent IS THE SAME for each good.

(24) Tracey is NOT currently maximizing her total utility. I know this because the marginal utility per dollar spent IS NOT EQUAL across goods. Tracey is currently getting 5 utils of MU per dollar spent on lipstick and 10 utils of MU per dollar spent on mascara. In order to move closer to utility maximization, Tracey needs to spend more of her limited income on mascara and less of her limited income on lipstick.

(25)  $E_D = 100\%$  increase in  $Q_d$  /  $40\%$  decrease in  $P$   
 $E_D = 2.50 > 1$  ELASTIC demand for pizza

(26)  $E_D = 10\%$  decrease in  $Q_d$  /  $60\%$  increase in  $P$   
 $E_D = 0.17 < 1$  INELASTIC demand for roses

(27)  $E_D = 200\%$  increase in  $Q_d$  /  $75\%$  decrease in  $P$   
 $E_D = 2.67 > 1$  ELASTIC demand for HDTVs

(28)  $E_D = 20\%$  decrease in  $Q_d$  /  $80\%$  increase in  $P$   
 $E_D = 0.25 < 1$  INELASTIC demand for sneakers

(29)  $E_D = 25\%$  increase in  $Q_d$  /  $25\%$  decrease in  $P$   
 $E_D = 1.00$  UNIT ELASTIC demand for birthday cakes

(30)  $E_D = 15\% / 25\% = 0.60 < 1$  INELASTIC demand for calendars

(31)  $E_D = 50\% / 10\% = 5.00 > 1$  ELASTIC demand for beer

(32)  $E_D = 20\% / 30\% = 0.67 < 1$  INELASTIC demand for nail polish

(33)  $E_D = 15\% / 10\% = 1.50 > 1$  ELASTIC demand for paper

(34) Law of Demand: a decrease in the price of pizza will increase its quantity demanded

$$E_D = \% \Delta Q_d / \% \Delta P \quad 3.0 = X / 10\% \quad X = 30\%$$

(35) Law of Demand: an increase in the price of cookies will decrease their quantity demanded

$$E_D = \% \Delta Q_d / \% \Delta P \quad 0.50 = X / 20\% \quad X = 10\%$$

(36) Law of Demand: an increase in the price of orange juice will decrease its quantity demanded

$$E_D = \% \Delta Q_d / \% \Delta P \quad 1.50 = X / 30\% \quad X = 45\%$$

(37) Law of Demand: an increase in the price of health insurance will decrease its quantity demanded

$$E_D = \% \Delta Q_d / \% \Delta P \quad 0.60 = X / 10\% \quad X = 6\%$$

(38)  $E_D = 4.50 > 1$  ELASTIC demand for Big Mac sandwiches

(39)  $TR = \$1.39 * 15,000 = \$20,850$  weekly sales revenue

(40) Total Cost =  $\$0.30 * 15,000 = \$4,500$  weekly production cost

(41) Total profit =  $\$20,850 - \$4,500 = \$16,350$  weekly profit

(42)  $\$1.39 * 0.80 = \$1.11$  selling price

(43) Law of Demand: lower the price of a Big Mac and its quantity demanded will increase.

(44) 90%

(45) 28,500 sandwiches per week

(46)  $\$1.11 * 28,500 = \$31,635$  weekly sales revenue

(47)  $\$0.30 * 28,500 = \$8,550$

(48)  $\$31,635 - \$8,550 = \$23,085$  weekly profit

(49) Yes, the firm's total profit increases by \$6,735 per week, so it does appear to be a desirable pricing strategy to pursue.

(50)  $E_D = 0.50 < 1$  INELASTIC demand for tires

(51)  $TR = \$100 * 400 = \$40,000$  weekly sales revenue

(52) Total cost =  $\$12 * 400 = \$4,800$  weekly production cost

(53) Total profit = \$40,000 - \$4,800 = \$35,200 weekly profit

(54)  $\$100 * 0.75 = \$75.00$  selling price

(55) Law of Demand: a decrease in the price per tire will increase their quantity demanded

(56) 12.5%

(57) 450 tires per week

(58)  $TR = \$75.00 * 450 = \$33,750$  sales revenue per week

(59) Total cost =  $\$12 * 450 = \$5,400$  weekly production cost

(60) Total profit =  $\$33,750 - \$5,400 = \$28,350$  total weekly profit

(61) No, the firm's total profit would decrease by \$6,850 per week, so it does not appear to be a desirable pricing strategy to pursue.

(62)  $TR = \$50 * 80$  lawns = \$4,000

(63)  $TC = \$15 * 80$  lawns = \$1,200

(64) Total Profit = \$2,800

(65) Now think about this! A price drop from \$50 to \$40 is \$10, or 20% of the original price. If the Elasticity Coefficient is 3.00, and Larry's lowering price by 20%, the his "quantity" should increase by THREE TIMES as much..... 60%! So Larry can now expect to have 128 regular customers every two weeks.

(66)  $TR = \$40 * 128$  lawns = \$5,120

(67)  $TC = \$15 * 128$  lawns = \$1,920

(68) Total Profit = \$3,200

(69) Yes, lowering price was a smart business decision! When demand for the good/service is ELASTIC, like it is here, cutting price will get you A LOT MORE customers. Your TR increases, and in this case, Total Profit also increased.

(70)  $TR = \$150 * 500 = \$75,000$

(71)  $TC = \$40 * 500 = \$20,000$

(72) Total Profit = \$55,000

(73) Now think about this! A price drop from \$150 to \$120 is \$30, or 20% of the original price. If the Elasticity Coefficient is 0.25, and Carl's lowering price by 20%, the his "quantity" should increase by ONLY A QUARTER as much..... 5%! So Carl can now expect to sell 525 of these textbook per semester.

(74)  $TR = \$120 * 525 = \$63,000$

(75)  $TC = \$40 * 525 = \$21,000$

(76) Total Profit = \$42,000

(77) No, lowering price was a NOT smart business decision! When demand for the good/service is INELASTIC, like it is here, cutting price will get you ONLY A FEW more textbook sold. Your TR decreases, and in this case, Total Profit also decreased.

(78)  $\% \Delta Q_D = 40\% / \% \Delta P = 33\% \Rightarrow E_D = 40/33$  or 1.21  
Coefficient is greater than ONE in absolute value, so demand is ELASTIC.

(79)  $\% \Delta Q_D = 25\% / \% \Delta P = 33\% \Rightarrow E_D = 25/33$  or 0.76  
Coefficient is less than ONE in absolute value, so demand is INELASTIC.

(80) INELASTIC

(81) 25%

(82) decrease of 6.25%

(83) \$375 million

(84) 25%

(85) decrease of 62.5%

(86) \$150 million

(87) You can figure this out!

(88) 40%

(89) decrease of 20%

(90) 20%

(91) decrease of 60%

(92) You can figure this out!

(93) 3.3 elastic demand

(94) 2.3 elastic demand

(95) 1.6 elastic demand

(96) 1.2 elastic demand

(97) 0.82 inelastic demand

(98) 0.63 inelastic demand

(99) See your notes or textbook!