ANSWERS

MATCHING

1-g; 2-h; 3-i; 4-j; 5-k; 6-l; 7-e; 8-d; 9-m; 10-f; 11-c; 12-a; 13-b.

ANSWERS

MULTIPLE CHOICE

1. c   The principle of diminishing marginal utility says that at some point, the additional satisfaction one gets from consuming additional units declines. See page 157.

2. c   When we say that the utility of the second slice of pizza is 20, we mean we are getting an additional 20 units of utility, so the marginal utility of the second slice is 20. See page 157.

3. b   Options a, c and d would be true statements if "total" was changed to "marginal." See pages 158-160, especially Table 7-1 on page 159.

4. b   You are better off by choosing to spend an additional sum of money on the good that provides you the greatest marginal utility per dollar. See pages 158-159.

5. a   Applying the rational choice rule, you divide the MU by the price. Increase consumption of the good that gives the greater marginal utility per dollar. Since 40/1 is greater than 60/2, then increase consumption of A and decrease consumption of B. See pages 158-160.

6. b   Increase the consumption of that good that provides the greatest MU/P. Since 40/2 is less than 60/2 you consume more of good B. See pages 158-160.

7. c   Increase the consumption of that good that provides the greatest MU/P. Since 40/1 equals 80/2 you consume equal amounts of both goods. See pages 158-160.

8. c   The trip to Vail will give the greatest marginal utility per dollar spent. See pages 158-160.

9. c   This is the rational choice. See pages 158-160.

10. b   When $MU_x/P_x > MU_y/P_y$, the marginal utility for the money spent on good X exceeds that for good Y. You are getting more satisfaction for the last dollar spent on good X. Therefore, buy more of good X. See pages 159-160.

11. b   A decrease in the price of Y will cause $MU_x/P_x < MU_y/P_y$. Therefore, one should buy more of good Y (and less of good X). See pages 159-160.

12. b   Only the opportunity cost is needed to determine what would be required to get you to work another hour. See page 160.

13. c   See the definition of bounded rationality in the text on page 162.

14. b   Divide the intercept on the chocolate axis by the intercept on the soda axis to find the price of chocolate in terms of soda. One can buy either 3 chocolate bars or 6 sodas, or 1 bar for 2 sodas. See pages 162-165.

15. d   A fall in the price of chocolate means that the same amount of soda will give more pieces of chocolate, so the income constraint rotates up from the intersection of the soda axis, hence becoming steeper. See pages 162-165.

16. b   A movement down the curve represents the soda needed to compensate the individual— i. e., keep her utility constant—for giving up some chocolate. See pages 162-165.

17. c   The equilibrium is where the indifference curve is tangent to the budget line. See pages 165-167.

ANSWERS

SHORT-ANSWER QUESTIONS

1. Marginal utility refers to the satisfaction one gets from the consumption of an incremental or additional unit of a product above and beyond what one has consumed up to that point. (155-156)

2. The fact that you enjoy each subsequent slice less and less follows the principle of diminishing marginal utility. It states that, at some point, the marginal utility received from each additional unit of a good begins to decrease with each additional unit consumed. (155-156)

3. You would choose to see the John Turturo movie because it would give more pleasure for the same amount of money. This decision follows the principle of rational choice which tells us to spend our money on those goods that give us the most marginal utility per dollar. (157-158)

4. The formulas that embody the principle of rational choice are:
   If $MU_x/P_x > MU_y/P_y$, choose to consume an additional unit of good x;
   If $MU_x/P_x < MU_y/P_y$, choose to consume an additional unit of good y;
   If $MU_x/P_x = MU_y/P_y$, you're maximizing utility. (158; 160)

5. If the ratios of the marginal utility to the price of goods are equal, you cannot adjust your spending in any way to increase total utility. Changing your spending will result in additional utility for that good you increased. But that additional utility is less than the decrease in utility for that good that you have given up. Thus, the marginal utilities per dollar are no longer equal and total utility has fallen. Total utility is maximized where the ratios of the marginal utility to the price of goods are equal. (158-159)

6. If you were initially maximizing utility, it must be that $MU_{Big\ Macs}/\$2 = MU_{i.\ c.}/\$1$. If the price of ice cream cones rise, then you are no longer maximizing utility because $MU_{Big\ Macs}/\$2 > MU_{i.c.}/\$2$. To once again maximize utility, you would raise the marginal utility of ice cream cones and lower the marginal utility of Big Macs by choosing to consume more Big Macs and fewer ice cream cones. You would adjust your consumption to the point where the marginal utilities per dollar were once again equal. The price of ice cream cones *relative to Big Macs* rose and the quantity demanded fell; and the price of Big Macs *relative to ice creams* fell and the quantity demanded rose. This is the law of demand. (161)

ANSWERS

PROBLEMS AND APPLICATIONS

1. a. This question tests the concepts of marginal utility, total utility, and the principle of diminishing marginal utility. Marginal utility is the satisfaction one gets from the consumption of an *incremental* product. Total utility is the total satisfaction from all units consumed up to that point of consumption; it is the sum of all marginal utilities from consumption. (155-156)

Number of choc. chip cookies	Total utility	Marginal utility
1	20	20
2	37	17
3	51	14
4	62	11
5	70	8
6	75	5
7	77	2
8	76	−1

   b. The total utility curve is shown below. It is bowed downward because the slope of the marginal utility curve is negative. (155-156; Figure 7-1)

1-5
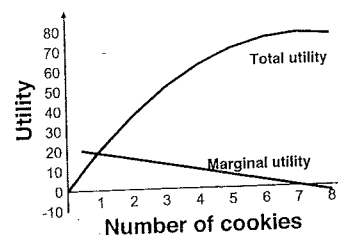
c. The marginal utility curve is shown on the previous page 1.b. Its slope is always negative because the marginal utility of each additional cookie is always declining. (155-156; Figure 7-1)

d. The principle of diminishing marginal utility is operative in this case. The principle of diminishing marginal utility as explained on pages 179-180 of your text states that as more of a good is consumed, beyond some point, the additional units of consumption will yield fewer units of utility than the previous units. This is shown in the table by the third column. Its values are always declining. (157)

e. The principle of diminishing marginal utility operates from the second cookie on. The second cookie gave less pleasure than the first cookie. This is true throughout, from 2 through 8. Marginal utility becomes zero between 7 and 8 cookies. The marginal utility of the 7th cookie is 2, but the marginal utility of the 8th is 1. (157)

The principle of rational choice, discussed on page 158, states: Spend your money on those goods that give you the most marginal utility (MU) per dollar. (158)

a. Choose the $2 slice of pizza. Marginal utility per dollar of the slice of pizza is 80 units of utility/$2 = 40 units of utility per dollar. Marginal utility per dollar of a hero sandwich is 60/ $2 = 30 units of utility per dollar. 40>30. (158)

b. Choose the $20,000 Toyota. Marginal utility per dollar for the Toyota is 120,000 units of utility/$20,000 = 6 units of utility per dollar. Marginal utility per dollar for the BMW is 200,000/ $40,000 = 5 units of utility per dollar. 6>5. (158)

c. Choose the history course. Here the two alternatives have a cost in time, not money. The analysis is the same. Just calculate the marginal utility per minute and choose the one with the higher marginal utility per minute. Marginal utility per minute for the economics course is 900 units of utility/1500 minutes = 0.6 units of utility per minute. Marginal utility per minute for the history course is 800 units of utility/ 1000 minutes = 0.8 units of utility per minute. 0.8 > 0.6. (158)

d. Take Tory out for a date to the Four Seasons. Marginal utility per dollar for taking Tory out is 600 units of utility/ $120 = 5 units of utility per dollar. Marginal utility per dollar for taking Sam out is 60 units of utility/ $15 = 4 units of utility per dollar. 5 > 4. (158)

3. This tests the principle of rational choice on page 158 which states that a rational individual will adjust consumption of all goods until the marginal utilities per dollar are equal.

a. You should take 3 science courses and 2 humanities courses. To determine this, first you must calculate the marginal utilities and marginal utilities per dollar when you are spending all your money. We show the calculations to arrive at the answer in the table below. Following the principle of rational choice, select that combination where the marginal utilities per dollar are equal. Looking only at those combinations where you are spending all your money, this is at the combination of 3 science courses and 2 humanities courses. We figured this out by figuring out different combinations of courses beginning with 6 science courses, calculating how many humanities courses could be purchased with the remaining funds, and comparing marginal utilities per dollar. If the marginal utility per dollar of science courses is lower than that for humanities course, choose one less science course and repeat the calculation. Keep doing this until the marginal utilities per dollar are the same for both. (157-160)

SCIENCE COURSES

Number of Courses	Total utility	Marginal utility	MU per $
0	0	0	0
1	4500	4500	3
2	7500	3000	2
3	9750	2250	1.5
4	11250	1500	1
5	11750	500	0.33
6	12000	250	0.17

HUMANITIES COURSES

Number of Courses	Total utility	Marginal utility	MU per $
0	0	0	0
1	7500	7500	2.5
2	12000	4500	1.5
3	15750	3750	1.25
4	18750	3000	1
5	21000	2250	0.75
6	22500	1500	0.5

b. Now you should take 3 science courses and 6 humanities courses. First you must calculate the marginal utilities and marginal utilities per dollar. This is shown in the table below. Next, following the principle of rational choice, select that combination where the marginal utilities per dollar are equal and you cannot buy any more courses. This is at the combination of 3 science courses and 6 humanities courses. (157-160)

SCIENCE COURSES

Number of Courses	Total utility	Marginal utility	MU per $
0	0	0	0
1	4500	4500	3
2	7500	3000	2
3	9750	2250	1.5
4	11250	1500	1
5	11750	500	0.33
6	12000	250	0.17

HUMANITIES COURSES

| Number of Courses	Total utility	Marginal utility	MU per $
0	0	0	0
1	7500	7500	7.5
2	12000	4500	4.5
3	15750	3750	3.25
4	18750	3000	3
5	21000	2250	2.25
6	22500	1500	1.5

4. The budget constraint is drawn below. It was constructed by first finding out the y-intercept — how many pens could be bought with the entire $10: 20 pens—and then finding out the x-intercept — how many notebooks could be bought with the entire $10: 10 notebooks. Connect these points to get the budget constraint. (162-167)
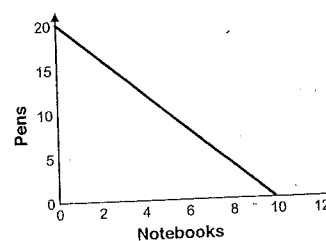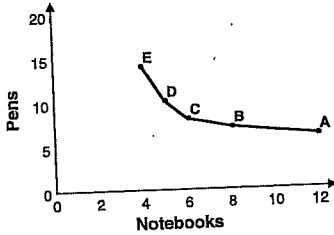

a. The slope the budget constraint is $P_{notebooks} / P_{pens} = \$1/0.50 = 2$. (194-195)

b. The budget constraint shifts in, intersecting the pen axis at 16 and notebook axis at 8. To find this, use the process described to find the initial budget constraint. Since relative prices did not change, the slope is still 2. This is shown below. (162-167)
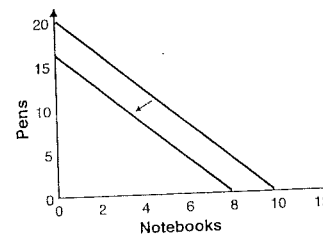

c. Since relative prices changed, the budget constraint rotates. To find the new budget constraint, find first how many notebooks can be bought at their new price: 4. The y-intercept remains at 16 since the price of pens did not change. The budget constraint rotates in along the notebook axis and intersects it at 4 notebooks. Since notebooks became more expensive, the slope became steeper. The slope of the line is $P_{notebooks} / P_{pens} = \$2/0.50 = 4$. This is shown in figure (C) below. (162-167)
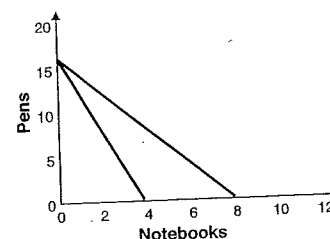
5.   a.   To graph the indifference curve, plot each set of points which give the same utility. This is done in graph (A) below. (162-167)

b. The marginal rate of substitution between the combinations C and D is equal to the slope between C and D, $MU_{notebooks} / MU_{pens}$ = 2. (162-167)

c. To find where you maximize utility given the budget constraint, find that point where the slope of the budget constraint equals the marginal rate of substitution between pens and notebooks. This is at points between C and D shown in the graph below. At points between C and D, the slope of budget constraint is equal to the marginal rate of substitution: $MU_{notebooks} / MU_{pens} = 2 = P_{notebooks} / P_{pens}$.

The budget constraint is tangent to the indifference curve at points between C and D. This implies that any other indifference curve that intersects the budget constraint line gives you less total utility than does the current indifference curve. A rational choice maximizes your own utility. Hence, you should choose combinations represented by points between C and D. (162-167)
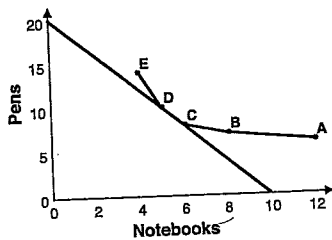
ANSWERS

A BRAIN TEASER

1. Higher, because the marginal utility on marriages is very high–especially for the first marriage. That is, people are willing to pay dearly for a memorable event. Moreover, there is a very inelastic demand (there are few "acceptable" substitutes) for the services and supplies provided for weddings. This, too, has a tendency to result in high prices. Moreover, there's more to life than a literal application of the rational choice model. We do crazy things just for the sake of doing crazy things. We follow rules of thumb–like we don't want to be seen as a "cheap skate" on our daughter's (or our future wife's) wedding day. All of these elements are not present for grocery store shopping. (178; 185-186)

ANSWERS

POTENTIAL ESSAY QUESTIONS

The following are annotated answers. They indicate the general idea behind the answer.

1. As we consume more of any good or service then the marginal utility declines. We consume that combination of goods and services for which the marginal utility in relation to the price is equal. If the price for good X falls then the marginal utility of good X is relation to its price is now greater than for other goods and services. We are simply getting more satisfaction for the money spent on the last unit of good X consumed. Therefore, we buy more of good X. So, as the price of good X falls we find it rational to buy more of good X. This is the law of demand.