INTERMEDIATE ECONOMIC WORKOUTS

Quizzes

2.1 In Problem 2.1, if you have an income of \$12 to spend, if commodity 1 costs \$2 per unit, and if commodity 2 costs \$6 per unit, then the equation for your budget line can be written as

(a) $x_1/2 + x_2/6 = 12$.

(b) $(x_1 + x_2)/8 = 12$.

(c) $x_1 + 3x_2 = 6$.

(d) $3x_1 + 7x_2 = 13$.

(e) $8(x_1 + x_2) = 12$.

2.2 In Problem 2.3, if you could exactly afford either 6 units of x and 14 units of y, or 10 units of x and 6 units of y, then if you spent all of your income on y, how many units of y could you buy?

(a) 26

(b) 18

(c) 34

(d) 16

(e) None of the other options are correct.

2.3 In Problem 2.4, Murphy used to consume 100 units of x and 50 units of y when the price of x was 2 and the price of y was 4. If the price of x rose to 5 and the price of y rose to 8, how much would Murphy's income have to rise so that he could still afford his original bundle?

(a) 700.

(b) 500.

(c) 350.

(d) 1,050.

(e) None of the other options are correct.

2.4 In Problem 2.7, Edmund must pay \$6 each for punk rock video cassettes. If Edmund is paid \$48 per sack for accepting garbage and if his relatives send him an allowance of \$384, then his budget line is described by the equation:

(a) $6V = 48G$.

(b) $6V + 48G = 384$.

(c) $6V - 48G = 384$.

(d) $6V = 384 - G$.

(e) None of the other options are correct.

2.5 In Problem 2.10, if in the same amount of time that it takes her to read 40 pages of economics and 30 pages of sociology, Martha could read 30 pages of economics and 50 pages of sociology, then which of these equations describes combinations of pages of economics, E, and sociology, S, that she could read in the time it takes to read 40 pages of economics and 30 pages of sociology?

(a) $E + S = 70$.

(b) $E/2 + S = 50$.

(c) $2E + S = 110$.

(d) $E + S = 80$.

(e) All of the above.

2.6 In Problem 2.11, ads in the boring business magazine are read by 300 lawyers and 1,000 MBAs. Ads in the consumer publication are read by 250 lawyers and 300 MBAs. If Harry had \$3,000 to spend on advertising, if the price of ads in the boring business magazine were \$600, and if the price of ads in the consumer magazine were \$300, then the combinations of recent MBAs and lawyers with hot tubs whom he could reach with his advertising budget would be represented by the integer values along a line segment that runs between the two points

(a) (2,500, 3,000) and (1,500, 5,000).

(b) (3,000, 3,500) and (1,500, 6,000).

(c) (0, 3,000) and (1,500, 0).

(d) (3,000, 0) and (0, 6,000).

(e) (2,000, 0) and (0, 5,000).

2.7 In the economy of Mungo, discussed in Problem 2.12, there is a third creature called Ike. Ike has a red income of 40 and a blue income of 10. (Recall that blue prices are 1 bcu [blue currency unit] per unit of ambrosia and 1 bcu per unit of bubble gum. Red prices are 2 rcus [red currency units] per unit of ambrosia and 6 rcus per unit of bubble gum. You have to pay twice for what you buy, once in red currency and once in blue currency.) If Ike spends all of its blue income, but not all of its red income, then it must be that it consumes

(a) at least 5 units of bubble gum.

(b) at least 5 units of ambrosia.

(c) exactly twice as much bubble gum as ambrosia.

(d) at least 15 units of bubble gum.

(e) equal amounts of ambrosia and bubble gum.

3.1 In Problem 3.1, Charlie's indifference curves have the equation x_B = constant$/x_A$, where larger constants correspond to better indifference curves. Charlie strictly prefers the bundle (7,15) to the bundle:

(a) (15,7).

(b) (8,14).

(c) (11,11).

(d) all three of these bundles.

(e) none of these bundles.

3.2 In Problem 3.2, Ambrose has indifference curves with the equation $x_2 = \text{constant} - 4x_1^{1/2}$, where larger constants correspond to higher indifference curves. If good 1 is drawn on the horizontal axis and good 2 on the vertical axis, what is the slope of Ambrose's indifference curve when his consumption bundle is (1,6)?

(a) $-1/6$

(b) $-6/1$

(c) -2

(d) -7

(e) -1

3.3 In Problem 3.8, Nancy Lerner is taking a course from Professor Goodheart who will count only her best midterm grade and from Professor Stern who will count only her worst midterm grade. In one of her classes, Nancy has scores of 50 on her first midterm and 30 on her second midterm. When the first midterm score is measured on the horizontal axis and her second midterm score on the vertical, her indifference curve has a slope of zero at the point (50,30). ¿From this information we can conclude

(a) this class could be Professor Goodheart's but couldn't be Professor Stern's.

(b) this class could be Professor Stern's but couldn't be Professor Goodheart's.

(c) this class couldn't be either Goodheart's or Stern's.

(d) this class could be either Goodheart's or Stern's.

3.4 In Problem 3.9, if we graph Mary Granola's indifference curves with avocados on the horizontal axis and grapefruits on the vertical axis, then whenever she has more grapefruits than avocados, the slope of her indifference curve is -2. Whenever she has more avocados than grapefruits, the slope is $-1/2$. Mary would be indifferent between a bundle with 24 avocados and 36 grapefruits and another bundle that has 34 avocados and

(a) 28 grapefruits.

(b) 32 grapefruits.

(c) 22 grapefruits.

(d) 25 grapefruits.

(e) 26.50 grapefruits.

3.5 In Problem 3.12, recall that Tommy Twit's mother measures the departure of any bundle from her favorite bundle for Tommy by the sum of the absolute values of the differences. Her favorite bundle for Tommy is (2,7)—that is, 2 cookies and 7 glasses of milk. Tommy's mother's indifference curve that passes through the point $(c, m) = (3, 6)$ also passes through

(a) the point (4,5).

(b) the points (2,5), (4,7), and (3,8).

(c) the point (2,7).

(d) the points (3, 7), (2, 6), and (2, 8).

(e) None of the other options are correct.

3.6 In Problem 3.1, Charlie's indifference curves have the equation $x_B = \text{constant}/x_A$, where larger constants correspond to better indifference curves. Charlie strictly prefers the bundle (9,19) to the bundle:

(a) (19,9).

(b) (10,18).

(c) (15,17).

(d) More than one of these options are correct.

(e) None of the above are correct.

4.1 In Problem 4.1, Charlie has the utility function $U(x_A, x_B) = x_A x_B$. His indifference curve passing through 10 apples and 30 bananas will also pass through the point where he consumes 2 apples and

(a) 25 bananas.

(b) 50 bananas.

(c) 152 bananas.

(d) 158 bananas.

(e) 150 bananas.

4.2 In Problem 4.1, Charlie's utility function is $U(A, B) = AB$, where A and B are the numbers of apples and bananas, respectively, that he consumes. When Charlie is consuming 20 apples and 100 bananas, then if we put apples on the horizontal axis and bananas on the vertical axis, the slope of his indifference curve at his current consumption is

(a) -20.

(b) -5.

(c) -10.

(d) $-1/5$.

(e) $-1/10$.

4.3 In Problem 4.2, Ambrose has the utility function $U(x_1, x_2) = 4x_1^{1/2} + x_2$. If Ambrose is initially consuming 81 units of nuts and 14 units of berries, then what is the largest number of units of berries that he would be willing to give up in return for an additional 40 units of nuts?

(a) 11

(b) 25

(c) 8

(d) 4

(e) 2

4.4 Joe Bob from Problem 4.12 has a cousin Jonas who consume goods 1 and 2. Jonas thinks that 2 units of good 1 is always a perfect substitute for 3 units of good 2. Which of the following utility functions is the only one that would *not* represent Jonas's preferences?

(a) $U(x_1, x_2) = 3x_1 + 2x_2 + 1,000$.

(b) $U(x_1, x_2) = 9x_1^2 + 12x_1x_2 + 4x_2^2$.

(c) $U(x_1, x_2) = \min\{3x_1, 2x_2\}$.

(d) $U(x_1, x_2) = 30x_1 + 20x_2 - 10,000$.

(e) More than one of the above does not represent Jonas's preferences.

4.5 In Problem 4.7, Harry Mazzola has the utility function $U(x_1, x_2) = \min\{x_1 + 2x_2, 2x_1 + x_2\}$. He has \$40 to spend on corn chips and french fries. If the price of corn chips is 5 dollars per unit and the price of french fries is 5 dollars per unit, then Harry will

(a) definitely spend all of his income on corn chips.

(b) definitely spend all of his income on french fries.

(c) consume at least as many units of corn chips as of french fries, but might consume both.

(d) consume at least as many units of french fries as of corn chips, but might consume both.

(e) consume an equal number of units of french fries and corn chips.

4.6 Phil Rupp's sister Ethel has the utility function $U(x, y) = \min\{2x + y, 3y\}$. Where x is measured on the horizontal axis and y on the vertical axis, her indifference curves consist of

(a) a vertical line segment and a horizontal line segment that meet in a kink along the line $y = 2x$.

(b) a vertical line segment and a horizontal line segment that meet in a kink along the line $x = 2y$.

(c) a horizontal line segment and a negatively sloped line segment that meet in a kink along the line $x = y$.

(d) a positively sloped line segment and a negatively sloped line segment that meet along the line $x = y$.

(e) a horizontal line segment and a positively sloped line segment that meet in a kink along the line $x = 2y$.

5.1 In Problem 5.1, Charlie has a utility function $U(x_A, x_B) = x_A x_B$, the price of apples is 1 and the price of bananas is 2. If Charlie's income were 240, how many units of bananas would he consume if he chose the bundle that maximized his utility subject to his budget constraint?

(a) 60

(b) 30

(c) 120

(d) 12

(e) 180

5.2 In Problem 5.1, if Charlie's income is 40, the price of apples is 5, and the price of bananas is 6, how many apples are contained in the best bundle that Charlie can afford?

(a) 8

(b) 15

(c) 10

(d) 11

(e) 4

5.3 In Problem 5.2, Clara's utility function is $U(X, Y) = (X + 2)(Y + 1)$. If Clara's marginal rate of substitution is -2 and she is consuming 10 units of good X, how many units of good Y is she consuming?

(a) 2

(b) 24

(c) 12

(d) 23

(e) 5

5.4 In Problem 5.3, Ambrose's utility function is $U(x_1, x_2) = 4x_1^{1/2} + x_2$. If the price of nuts is 1, the price of berries is 4, and his income is 72, how many units of nuts will Ambrose choose?

(a) 2

(b) 64

(c) 128

(d) 67

(e) 32

5.5 Ambrose's utility function is $4x_1^{1/2} + x_2$. If the price of nuts is 1, the price of berries is 4, and his income is 100, how many units of berries will Ambrose choose?

(a) 65

(b) 9

(c) 18

(d) 8

(e) 12

5.6 In Problem 5.6, Elmer's utility function is $U(x, y) = \min\{x, y^2\}$. If the price of x is 15, the price of y is 10, and Elmer chooses to consume 7 units of y, what must Elmer's income be?

(a) 1,610

(b) 175

(c) 905

(d) 805

(e) There is not enough information to tell.

6.1 (See Problem 6.1.) If Charlie's utility function is $X_A^4 X_B$, apples cost 90 cents each, and bananas cost 10 cents each, then Charlie's budget line is tangent to one of his indifference curves whenever the following equation is satisfied:

(a) $4X_B = 9X_A$.

(b) $X_B = X_A$.

(c) $X_A = 4X_B$.

(d) $X_B = 4X_A$.

(e) $90X_A + 10X_B = M$.

6.2 (See Problem 6.1.) If Charlie's utility function is $X_A^4 X_B$, the price of apples is p_A, the price of bananas is p_B, and his income is m, then Charlie's demand for apples is

(a) $m/(2p_A)$.

(b) $0.25p_A m$.

(c) $m/(p_A + p_B)$.

(d) $0.80m/p_A$.

(e) $1.25p_B m/p_A$.

6.3 Ambrose's brother Bartholomew has a utility function $U(x_1, x_2) = 24x_1^{1/2} + x_2$. His income is 51, the price of good 1 (nuts) is 4, and the price of good 2 (berries) is 1. How many units of nuts will Bartholomew demand?

(a) 19

(b) 5

(c) 7

(d) 9

(e) 16

6.4 Ambrose's brother Bartholomew has a utility function $U(x_1, x_2) = 8x_1^{1/2} + x_2$. His income is 23, the price of nuts is 2, and the price of berries is 1. How many units of berries will Bartholomew demand?

(a) 15

(b) 4

(c) 30

(d) 10

(e) There is not enough information to determine the answer.

6.5 In Problem 6.6, recall that Miss Muffet insists on consuming 2 units of whey per unit of curds. If the price of curds is 3 and the price of whey is 6, then if Miss Muffett's income is m, her demand for curds will be

(a) $m/3$.

(b) $6m/3$.

(c) $3C + 6W = m$.

(d) $3m$.

(e) $m/15$.

6.6 In Problem 6.8, recall that Casper's utility function is $3x + y$, where x is his consumption of cocoa and y is his consumption of cheese. If the total cost of x units of cocoa is x^2, the price of a unit of cheese is \$8, and Casper's income is \$174, how many units of cocoa will he consume?

(a) 9

(b) 12

(c) 23

(d) 11

(e) 24

6.7 (See Problem 6.13.) Kinko's utility function is $U(w, j) = \min\{7w, 3w + 12j\}$, where w is the number of whips that he owns and j is the number of leather jackets. If the price of whips is \$20 and the price of leather jackets is \$60, Kinko will demand:

(a) 6 times as many whips as leather jackets.

(b) 5 times as many leather jackets as whips.

(c) 3 times as many whips as leather jackets.

(d) 4 times as many leather jackets as whips.

(e) only leather jackets.

7.1 In Problem 7.1, if the only information we had about Goldie were that she chooses the bundle (6,6) when prices are (6,3) and she chooses the bundle (10, 0) when prices are (5,5), then we could conclude that

(a) the bundle (6,6) is revealed preferred to (10,0) but there is no evidence that she violates WARP.

(b) neither bundle is revealed preferred to the other.

(c) Goldie violates WARP.

(d) the bundle (10,0) is revealed preferred to (6,6) and she violates WARP.

(e) the bundle (10,0) is revealed preferred to (6,6) and there is no evidence that she violates WARP.

7.2 In Problem 7.3, Pierre's friend Henri lives in a town where he has to pay 3 francs per glass of wine and 6 francs per loaf of bread. Henri consumes 6 glasses of wine and 4 loaves of bread per day. Recall that Bob has an income of $15 per day and pays $.50 per loaf of bread and $2 per glass of wine. If Bob has the same tastes as Henri and if the only thing that either of them cares about is consumption of bread and wine, we can deduce

(a) nothing about whether one is better than the other.

(b) Henri is better off than Bob.

(c) Bob is better off than Henri.

(d) both of them violate the weak axiom of revealed preferences.

(e) Bob and Henri are equally well off.

7.3 Let us reconsider the case of Ronald in Problem 7.4. Let the prices and consumptions in the base year be as in situation D, where $p_1 = 3$, $p_2 = 1$, $x_1 = 5$, and $x_2 = 15$. If in the current year, the price of good 1 is 1 and the price of good 2 is 3, and his current consumptions of good 1 and good 2 are 25 and 10 respectively, what is the Laspeyres price index of current prices relative to base-year prices? (Pick the most nearly correct answer.)

(a) 1.67

(b) 1.83

(c) 1

(d) 0.75

(e) 2.50

7.4 On the planet Homogenia, every consumer who has ever lived consumes only two goods x and y and has the utility function $U(x, y) = xy$. The currency in Homogenia is the fragel. On this planet in 1900, the price of good 1 was 1 fragel and the price of good 2 was 2 fragels. Per capita income was 120 fragels. In 2000, the price of good 1 was 5 fragels and the price of good 2 was 5 fragels. The Laspeyres price index for the price level in 2000 relative to the price level in 1900 is

(a) 3.75.

(b) 5.

(c) 3.33.

(d) 6.25.

(e) not possible to determine from this information.

7.5 On the planet Hyperion, every consumer who has ever lived has a utility function $U(x, y) = \min\{x, 2y\}$. The currency of Hyperion is the doggerel. In 1850 the price of x was 1 doggerel per unit, and the price of y was 2 doggerels per unit. In 2000, the price of x was 10 doggerels per unit and the price of y was 4 doggerels per unit. The Paasche price index of prices in 2000 relative to prices in 1850 is

(a) 6.

(b) 4.67.

(c) 2.50.

(d) 3.50.

(e) not possible to determine without further information.

8.1 In Problem 8.1, Charlie's utility function is $x_A x_B$. The price of apples used to be \$1 per unit and the price of bananas was \$2 per unit. His income was \$40 per day. If the price of apples increased to \$1.25 and the price of bananas fell to \$1.25, then in order to be able to just afford his old bundle, Charlie would have to have a daily income of

(a) \$37.50.

(b) \$76.

(c) \$18.75.

(d) \$56.25.

(e) \$150.

8.2 In Problem 8.1, Charlie's utility function is $x_A x_B$. The price of apples used to be \$1 and the price of bananas used to be \$2, and his income used to be \$40. If the price of apples increased to 8 and the price of bananas stayed constant, the substitution effect on Charlie's apple consumption reduces his consumption by

(a) 17.50 apples.

(b) 7 apples.

(c) 8.75 apples.

(d) 13.75 apples.

(e) None of the other options are correct.

8.3 Neville, in Problem 8.2, has a friend named Colin. Colin has the same demand function for claret as Neville, namely $q = .02m - 2p$, where m is income and p is price. Colin's income is 6,000 and he initially had to pay a price of 30 per bottle of claret. The price of claret rose to 40. The substitution effect of the price change

(a) reduced his demand by 20.

(b) increased his demand by 20.

(c) reduced his demand by 8.

(d) reduced his demand by 32.

(e) reduced his demand by 18.

8.4 Goods 1 and 2 are perfect complements and a consumer always consumes them in the ratio of 2 units of good 2 per unit of good 1. If a consumer has income 120 and if the price of good 2 changes from 3 to 4, while the price of good 1 stays at 1, then the income effect of the price change

(a) is 4 times as strong as the substitution effect.

(b) does not change the demand for good 1.

(c) accounts for the entire change in demand.

(d) is exactly twice as strong as the substitution effect.

(e) is 3 times as strong as the substitution effect.

8.5 Suppose that Agatha in Problem 8.10 had \$570 to spend on tickets for her trip. She needs to travel a total of 1,500 miles. Suppose that the price of first-class tickets is \$0.50 per mile and the price of second-class tickets is \$0.30 per mile. How many miles will she travel by second class?

(a) 900

(b) 1,050

(c) 450

(d) 1,000

(e) 300

8.6 In Problem 8.4, Maude thinks delphiniums and hollyhocks are perfect substitutes, one for one. If delphiniums currently cost \$5 per unit and hollyhocks cost \$6 per unit and if the price of delphiniums rises to \$9 per unit,

(a) the income effect of the change in demand for delphiniums will be bigger than the substitution effect.

(b) there will be no change in the demand for hollyhocks.

(c) the entire change in demand for delphiniums will be due to the substitution effect.

(d) 1/4 of the change will be due to the income effect.

(e) 3/4 of the change will be due to the income effect.

9.1 In Problem 9.1, if Abishag owned 9 quinces and 10 kumquats and if the price of kumquats were 3 times the price of quinces, how many kumquats could she afford if she spent all of her money on kumquats?

(a) 26

(b) 19

(c) 10

(d) 13

(e) 10

9.2 Suppose that Mario in Problem 9.2 consumes eggplants and tomatoes in the ratio of 1 bushel of eggplant per bushel of tomatoes. His garden yields 30 bushels of eggplants and 10 bushels of tomatoes. He initially faced prices of $10 per bushel for each vegetable, but the price of eggplants rose to $30 per bushel, while the price of tomatoes stayed unchanged. After the price change, he would

(a) increase his eggplant consumption by 5 bushels.

(b) decrease his eggplant consumption by at least 5 bushels.

(c) increase his eggplant consumption by 7 bushels.

(d) decrease his eggplant consumption by 7 bushels.

(e) decrease his tomato consumption by at least 1 bushel.

9.3 (See Problem 9.9(b).) Dr. Johnson earns $5 per hour for his labor and has 80 hours to allocate between labor and leisure. His only other income besides his earnings from labor is a lump sum payment of $50 per week. Suppose that the first $200 per week of his labor income is untaxed, but all of his labor income above $200 is taxed at a rate of 40 percent.

(a) Dr. Johnson's budget line has a kink in it at the point where he takes 50 units of leisure.

(b) Dr. Johnson's budget line has a kink where his income is $250 and his leisure is 40 units.

(c) The slope of Dr. Johnson's budget line is everywhere -3.

(d) Dr. Johnson's budget line has no kinks in the part of it that corresponds to a positive labor supply.

(e) Dr. Johnson's budget line has a piece that is a horizontal straight line.

9.4 Dudley, in Problem 9.15, has a utility function $U(C,R) = C - (12 - R)^2$, where R is leisure and C is consumption per day. He has 16 hours per day to divide between work and leisure. If Dudley has a nonlabor income of \$40 per day and is paid a wage of \$6 per hour, how many hours of leisure will he choose per day?

(a) 6

(b) 7

(c) 8

(d) 10

(e) 9

9.5 Mr. Cog in Problem 9.7 has 18 hours a day to divide between labor and leisure. His utility function is $U(C,R) = CR$, where C is the number of dollars per day that he spends on consumption and R is the number of hours per day that he spends at leisure. If he has 16 dollars of nonlabor income per day and gets a wage rate of 13 dollars per hour when he works, his budget equation, expressing combinations of consumption and leisure that he can afford to have, is:

(a) $13R + C = 16$.

(b) $13R + C = 250$.

(c) $R + C/13 = 328$.

(d) $C = 250 + 13R$.

(e) $C = 298 + 13R$.

9.6 Mr. Cog in Problem 9.7 has 18 hours per day to divide between labor and leisure. His utility function is $U(C,R) = CR$, where C is the number of dollars per day that he spends on consumption and R is the number of hours per day that he spends at leisure. If he has a nonlabor income of 42 dollars per day and a wage rate of 13 dollars per hour, he will choose a combination of labor and leisure that allows him to spend *(a)* 276 dollars per day on consumption.

(b) 128 dollars per day on consumption.

(c) 159 dollars per day on consumption.

(d) 138 dollars per day on consumption.

(e) 207 dollars per day on consumption.

10.1 If Peregrine in Problem 10.1 consumes (1,000, 1,155) and earns (800,1365) and if the interest rate is 0.05, the present value of his endowment is

(a) 2,165.

(b) 2,100.

(c) 2,155.

(d) 4,305.

(e) 5,105.

10.2 Suppose that Molly from Problem 10.2 had an income of \$400 in period 1 and an income of \$550 in period 2. Suppose that her utility function were $c_1^a c_2^{1-a}$, where $a = 0.40$ and the interest rate were 0.10. If her income in period 1 doubled and her income in period 2 stayed the same, her consumption in period 1 would

(a) double.

(b) increase by \$160.

(c) increase by \$80

(d) stay constant.

(e) increase by \$400.

10.3 Mr. O. B. Kandle, of Problem 10.8, has a utility function $c_1 c_2$ where c_1 is his consumption in period 1 and c_2 is his consumption in period 2. He will have no income in period 2. If he had an income of 30,000 in period 1 and the interest rate increased from 10% to 12%,

(a) his savings would increase by 2% and his consumption in period 2 would also increase.

(b) his savings would not change but his consumption in period 2 would increase by 300.

(c) his consumption in both periods would increase.

(d) his consumption in both periods would decrease.

(e) his consumption in period 1 would decrease by 12% and his consumption in period 2 would also decrease.

10.4 Harvey Habit in Problem 10.9 has a utility function $U(c_1, c_2) = \min\{c_1, c_2\}$. If he had an income of 1,025 in period 1, and 410 in period 2, and if the interest rate were 0.05, how much would Harvey choose to spend on bread in period 1?

(a) 1,087.50

(b) 241.67

(c) 362.50

(d) 1,450

(e) 725

10.5 In the village in Problem 10.10, if the harvest this year is 3,000 and the harvest next year will be 1,100 bushels of grain, and if rats eat 50% of any grain that is stored for a year, how many bushels of grain could the villagers consume next year if they consume 1,000 bushels of grain this year?

(a) 2,100.

(b) 1,000.

(c) 4,100.

(d) 3,150.

(e) 1,200.

10.6 Patience has a utility function $U(c_1, c_2) = c_1^{1/2} + 0.83c_2^{1/2}$, c_1 is her consumption in period 1 and c_2 is her consumption in period 2. Her income in period 1 is 2 times as large as her income in period 2. At what interest rate will she choose to consume the same amount in period 1 as in period 2?

(a) 0.40

(b) 0.10

(c) 0.20

(d) 0

(e) 0.30

11.1 Ashley, in Problem 11.6, has discovered another wine, wine D. Wine drinkers are willing to pay \$40 to drink it right now. The amount that wine drinkers are willing to pay will rise by \$10 each year that the wine ages. The interest rate is 10%. How much would Ashley be willing to pay for the wine if he buys it as an investment? (Pick the closest answer.)

(a) \$56

(b) \$40

(c) \$100

(d) \$440

(e) \$61

11.2 Chillingsworth, from Problem 11.10, has a neighbor, Shivers, who faces the same options for insulating his house as Chillingsworth. But Shivers has a larger house. Shivers's annual fuel bill for home heating is 1,000 dollars per year. Plan A will reduce his annual fuel bill by 15%, plan B will reduce it by 20%, and plan C will eliminate his need for heating fuel altogether. The plan A insulation job would cost Shivers 1,000 dollars, plan B would cost him 1,900 dollars, and plan C would cost him 11,000 dollars. If the interest rate is 10% and his house and the insulation job last forever, which plan is the best for Shivers?

(a) Plan A.

(b) Plan B.

(c) Plan C.

(d) Plans A and B are equally good.

(e) He is best off using none of the plans.

11.3 The price of an antique is expected to rise by 2% during the next year. The interest rate is 6%. You are thinking of buying an antique and selling it a year from now. You would be willing to pay a total of \$200 for the pleasure of owning the antique for a year. How much would you be willing to pay to buy this antique? (See Problem 11.5.)

(a) \$3,333.33

(b) \$4,200

(c) \$200

(d) \$5,000

(e) \$2,000

11.4 A bond has a face value of \$9,000. It will pay \$900 in interest at the end of every year for the next 46 years. At the time of the final interest payment, 46 years from now, the company that issued the bond will "redeem the bond at face value." That is, the company buys back the bond from its owner at a price equal to the face value of the bond. If the interest rate is 10% and is expected to remain at 10%, how much would a rational investor pay for this bond right now?

(a) \$9,000

(b) \$50,400

(c) \$41,400

(d) More than any of the above numbers.

(e) Less than any of the above numbers.

11.5 The sum of the infinite geometric series $1, 0.86, 0.86^2, 0.86^3, \ldots$ is closest to which of the following numbers?

(a) Infinity

(b) 1.86

(c) 7.14

(d) 0.54

(e) 116.28

11.6 If the interest rate is 11% and will remain 11% forever, how much would a rational investor be willing to pay for an asset that will pay him \$5,550 one year from now, \$1,232 two years from now, and nothing at any other time?

(a) \$6,000

(b) \$5,000

(c) \$54,545.45

(d) \$72,000

(e) \$7,000

12.1 In Problem 12.9, Billy has a von Neumann-Morgenstern utility function $U(c) = c^{1/2}$. If Billy is not injured this season, he will receive an income of 25 million dollars. If he is injured, his income will be only 10,000 dollars. The probability that he will be injured is .1 and the probability that he will not be injured is .9. His expected utility is

(a) 4,510.

(b) between 24 million and 25 million dollars.

(c) 100,000.

(d) 9,020.

(e) 18,040.

12.2 (See Problem 12.2.) Willy's only source of wealth is his chocolate factory, which may be damaged by a flood. Let c_f and c_{nf} be his wealth contingent on a flood and on no flood, respectively. His utility function is $pc_f^{1/2} + (1-p)c_{nf}^{1/2}$, where p is the probability of a flood and $1-p$ is the probability of no flood. The probability of a flood is $p = 1/15$. The value of Willy's factory is \$600,000 if there is no flood and 0 if there is a flood. Willy can buy insurance where if he buys \$$x$ worth of insurance, he must pay the insurance company \$$3x/17$ whether there is a flood or not, but he gets back \$$x$ from the company if there is a flood. Willy should buy

(a) no insurance since the cost per dollar of insurance exceeds the probability of a flood.

(b) enough insurance so that if there were a flood, after he collected his insurance his wealth would be 1/9 of what it would be if there were no flood.

(c) enough insurance so that if there were a flood, after he collected his insurance, his wealth would be the same whether there were a flood or not.

(d) enough insurance so that if there were a flood, after he collected his insurance, his wealth would be 1/4 of what it would be if there were no flood.

(e) enough insurance so that if there were a flood, after he collects his insurance his wealth would be 1/7 of what it would be if there were no flood.

12.3 Sally Kink is an expected utility maximizer with utility function $pu(c_1) + (1-p)u(c_2)$, where for any $x < 4,000$, $u(x) = 2x$ and where $u(x) = 4,000 + x$ for x greater than or equal to 4,000. (Hint: Draw a graph of $u(x)$.)

(a) Sally will be risk averse if her income is less than 4,000 but risk loving if her income is more than 4,000.

(b) Sally will be risk neutral if her income is less than 4,000 and risk averse if her income is more than 4,000.

(c) For bets that involve no chance of her wealth's exceeding 4,000, Sally will take any bet that has a positive expected net payoff.

(d) Sally will never take a bet if there is a chance that it leaves her with wealth less than 8,000.

(e) None of the above are true.

12.4 (See Problem 12.11.) Martin's expected utility function is $pc_1^{1/2} + (1-p)c_2^{1/2}$, where p is the probability that he consumes c_1 and $1-p$ is the probability that he consumes c_2. Wilbur is offered a choice between getting a sure payment of \$$Z$ or a lottery in which he receives \$2,500 with probability .40 and \$900 with probability .60. Wilbur will choose the sure payment if

(a) $Z > 1,444$ and the lottery if $Z < 1,444$.

(b) $Z > 1,972$ and the lottery if $Z < 1,972$.

(c) $Z > 900$ and the lottery if $Z < 900$.

(d) $Z > 1,172$ and the lottery if $Z < 1,172$.

(e) $Z > 1,540$ and the lottery if $Z < 1,540$.

12.5 Clancy has \$4,800. He plans to bet on a boxing match between Sullivan and Flanagan. He finds that he can buy coupons for \$6 that will pay off \$10 each if Sullivan wins. He also finds in another store some coupons that will pay off \$10 if Flanagan wins. The Flanagan tickets cost \$4 each. Clancy believes that the two fighters each have a probability of 1/2 of winning. Clancy is a risk averter who tries to maximize the expected value of the natural log of his wealth. Which of the following strategies would maximize his expected utility?

(a) Don't gamble at all.

(b) Buy 400 Sullivan tickets and 600 Flanagan tickets.

(c) Buy exactly as many Flanagan tickets as Sullivan tickets.

(d) Buy 200 Sullivan tickets and 300 Flanagan tickets.

(e) Buy 200 Sullivan tickets and 600 Flanagan tickets.

13.1 Suppose that Ms. Lynch in Problem 13.1 can make up her portfolio using a risk-free asset that offers a sure-fire rate of return of 15% and a risky asset with expected rate of return 30%, with standard deviation 5. If she chooses a portfolio with expected rate of return 18.75%, then the standard deviation of her return on this portfolio will be:

(a) 0.63.

(b) 4.25.

(c) 1.25.

(d) 2.50.

(e) None of the other options are correct.

13.2 Suppose that Fenner Smith of Problem 13.2 must divide his portfolio between two assets, one of which gives him an expected rate of return of 15 with zero standard deviation and one of which gives him an expected rate of return of 30 and has a standard deviation of 5. He can alter the expected rate of return and the variance of his portfolio by changing the proportions in which he holds the two assets. If we draw a "budget line" with expected return on the vertical axis and standard deviation on the horizontal axis, depicting the combinations that Smith can obtain, the slope of this budget line is

(a) 3.

(b) -3.

(c) 1.50.

(d) -1.50.

(e) 4.50.

14.1 In Problem 14.1, Sir Plus has a demand function for mead that is given by the equation $D(p) = 100 - p$. If the price of mead is 75, how much is Sir Plus's net consumer's surplus?

(a) 312.50

(b) 25

(c) 625

(d) 156.25

(e) 6,000

14.2 Ms. Quasimodo in Problem 14.3 has the utility function $U(x, m) = 100x - x^2/2 + m$ where x is her consumption of earplugs and m is money left over to spend on other stuff. If she has \$10,000 to spend on earplugs and other stuff, and if the price of earplugs rises from \$50 to \$95, then her net consumer's surplus

(a) falls by \$1,237.50.

(b) falls by \$3237.50.

(c) falls by \$225.

(d) increases by \$618.75.

(e) increases by \$2,475.

14.3 Bernice in Problem 14.5 has the utility function $u(x, y) = \min\{x, y\}$, where x is the number of pairs of earrings she buys per week and y is the number of dollars per week she has left to spend on other things. (We allow the possibility that she buys fractional numbers of pairs of earrings per week.) If she originally had an income of \$13 per week and was paying a price of \$2 per pair of earrings, then if the price of earrings rose to \$4, the compensating variation of that price change (measured in dollars per week) would be closest to

(a) \$5.20.

(b) \$8.67.

(c) \$18.33.

(d) \$17.33.

(e) \$16.33.

14.4 If Bernice (whose utility function is $\min\{x, y\}$ where x is her consumption of earrings and y is money left for other stuff) had an income of \$16 and was paying a price of \$1 for earrings when the price of earrings went up to \$8, then the equivalent variation of the price change was

(a) \$12.44.

(b) \$56.

(c) \$112.

(d) \$6.22.

(e) \$34.22.

14.5 In Problem 14.7, Lolita's utility function is $U(x, y) = x - x^2/2 + y$, where x is her consumption of cow feed and y is her consumption of hay. If the price of cow feed is .40, the price of hay is 1, and her income is 4 and if Lolita chooses the combination of hay and cow feed that she likes best from among those combinations she can afford, her utility will be

(a) 4.18.

(b) 3.60.

(c) 0.18.

(d) 6.18.

(e) 2.18.

15.1 In Gas Pump, South Dakota, every Buick owner's demand for gasoline is $20 - 5p$ for p less than or equal to 4 and 0 for $p > 4$. Every Dodge owner's demand is $15 - 3p$ for p less than or equal to 5 and 0 for $p > 5$. Suppose that Gas Pump has 100 Buick owners and 50 Dodge owners. If the price of gasoline is 4, what is the total amount of gasoline demanded in Gas Pump?

(a) 300 gallons

(b) 75 gallons

(c) 225 gallons

(d) 150 gallons

(e) None of the other options are correct.

15.2 In Problem 15.5, the demand function for drangles is given by $D(p) = (p + 1)^{-2}$. If the price of drangles is 10, then the price elasticity of demand is

(a) -7.27.

(b) -3.64.

(c) -5.45.

(d) -0.91.

(e) -1.82.

15.3 In Problem 15.6, the only quantities of good 1 that Barbie can buy are 1 unit or zero units. For x_1 equal to 0 or 1 and for all positive values of x_2, suppose that Barbie's preferences were represented by the utility function $(x_1 + 4)(x_2 + 2)$. Then if her income were 28, her reservation price for good 1 would be

(a) 12.

(b) 1.50.

(c) 6.

(d) 2.

(e) .40.

15.4 In the same football conference as the university in Problem 15.9 is another university where the demand for football tickets at each game is $80,000 - 12,000p$. If the capacity of the stadium at that university is 50,000 seats, what is the revenue-maximizing price for this university to charge per ticket?

(a) 3.33

(b) 2.50

(c) 6.67

(d) 1.67

(e) 10

15.5 In Problem 15.9, the demand for tickets is given by $D(p) = 200,000-10,000p$, where p is the price of tickets. If the price of tickets is 4, then the price elasticity of demand for tickets is

(a) -0.50.

(b) -0.38.

(c) -0.75.

(d) -0.13.

(e) -0.25.

16.1 This problem will be easier if you have done Problem 16.3. The inverse demand function for grapefruit is defined by the equation $p = 296 - 7q$, where q is the number of units sold. The inverse supply function is defined by $p = 17 + 2q$. A tax of 27 is imposed on suppliers for each unit of grapefruit that they sell. When the tax is imposed, the quantity of grapefruit sold falls to

(a) 31 units.

(b) 17.50 units.

(c) 26 units.

(d) 28 units.

(e) 29.50 units.

16.2 In a crowded city far away, the civic authorities decided that rents were too high. The long-run supply function of two-room rental apartments was given by $q = 18 + 2p$ and the long run demand function was given by $q = 114 - 4p$ where p is the rental rate in crowns per week. The authorities made it illegal to rent an apartment for more than 10 crowns per week. To avoid a housing shortage, the authorities agreed to pay landlords enough of a subsidy to make supply equal to demand. How much would the weekly subsidy per apartment have to be to eliminate excess demand at the ceiling price?

(a) 9 crowns

(b) 15 crowns

(c) 18 crowns

(d) 36 crowns

(e) 27 crowns

16.3 Suppose that King Kanuta from Problem 16.11 demands that each of his subjects give him 4 coconuts for every coconut that the subject consumes. The king puts all of the coconuts that he collects in a large pile and burns them. The supply of coconuts is given by $S(p_s) = 100p_s$, where p_s is the price received by suppliers. The demand for coconuts by the king's subjects is given by $D(p_d) = 8,320 - 100p_d$, where p_d is the price paid by consumers. In equilibrium, the price received by suppliers will be *(a)* 16.

(b) 24.

(c) 41.60.

(d) 208.

(e) None of the other options are correct.

16.4 In Problem 16.6, the demand function for Schrecklichs is $200 - 4P_S - 2P_L$ and the demand function for LaMerdes is $200 - 3P_L - P_S$, where P_S and P_L are respectively the price of Schrecklichs and LaMerdes. If the world supply of Schrecklichs is 100 and the world supply of Lamerdes is 90, then the equilibrium price of Schrecklichs is

(a) 8.

(b) 25.

(c) 42.

(d) 34.

(e) 16.

17.1 (See Problem 17.1.) An antique cabinet is being sold by means of an English auction. There are four bidders, Natalie, Heidi, Linda, and Eva. These bidders are unacquainted with each other and do not collude. Natalie values the cabinet at \$1,200, Heidi values it at \$950, Linda values it at \$1,700, and Eva values it at \$700. If the bidders bid in their rational self-interest, the cabinet will be sold to

(a) Linda for about \$1,700.

(b) Natalie for about \$1,200.

(c) either Linda or Natalie for about \$1,200. Which of these two buyers gets it is randomly determined.

(d) Linda for slightly more than \$1,200.

(e) either Linda or Natalie for about \$950. Which of these two buyers gets it is randomly determined.

17.2 (See Problems 17.2–17.5.) A dealer decides to sell an antique automobile by means of an English auction with a reservation price of \$900. There are two bidders. The dealer believes that there are only three possible values that each bidder's willingness to pay might take, \$6,300, \$2,700, and \$900. Each bidder has a probability of 1/3 of having each of these willingnesses to pay, and the probabilities of the two bidders are independent of the other's valuation. Assuming that the two bidders bid rationally and do not collude, the dealer's expected revenue from selling the automobile is

(a) \$4,500.

(b) \$3,300.

(c) \$2,700.

(d) \$2,100.

(e) \$6,300.

17.3 (See Problems 17.2–17.5.) First Fiddler's Bank has foreclosed on a home mortgage and is selling the house at auction. There are three bidders for the house, Jesse, Sheila, and Elsie. First Fiddler's does not know the willingness to pay of any of these bidders but on the basis of its previous experience believes that each of them has a probability of 1/3 of valuing the house at \$700,000, a probability of 1/3 of valuing it at \$500,000, and a probability of 1/3 of valuing it at \$200,000. First Fiddlers believes that these probabilities are independent between buyers. If First Fiddler's sells the house by means of a second-bidder sealed-bid auction (Vickrey auction), what will be the bank's expected revenue from the sale? (Choose the closest answer.)

(a) \$500,000

(b) \$474,074

(c) \$466,667

(d) \$666,667

(e) \$266,667

17.4 (See Problems 17.2–17.5.) A dealer decides to sell an oil painting by means of an English auction with a reservation price of slightly below \$81,000. If he fails to get a bid as high as his reservation price, he will burn the painting. There are two bidders. The dealer believes that each bidder's willingness to pay will take one of the three values: \$90,000, \$81,000, and \$45,000. The dealer believes that each bidder has a probability of 1/3 of having each of these three values. The probability distribution of each buyer's value is independent of that of the other's. Assuming that the two bidders bid rationally and do not collude, the dealer's expected revenue from selling the painting is slightly less than

(a) \$73,000.

(b) \$81,000.

(c) \$45,000.

(d) \$63,000.

(e) \$72,000.

17.5 (See Problem 17.8.) Jerry's Auction House in Purloined Hubcap, Oregon, holds sealed-bid used car auctions every Wednesday. Each car is sold to the highest bidder at the second-highest bidder's bid. On average, 2/3 of the cars that are auctioned are lemons and 1/3 are good used cars. A good used car is worth \$1,500 to any buyer. A lemon is worth \$150 to any buyer. Most buyers can do no better than picking at random from among these used cars. The only exception is Al Crankcase. Recall that Al can sometimes detect lemons by tasting the oil on the car's dipstick. A good car never fails Al's test, but half of the lemons fail his test. Al attends every auction, licks every dipstick, and bids his expected value of every car given the results of his test. Al will bid:

(a) \$825 for cars that pass his test and \$150 for cars that fail his test. Normal bidders will get only lemons.

(b) \$750 for cars that pass his test and \$500 for cars that fail his test. Normal bidders will get only lemons.

(c) \$500 for cars that pass his test and \$150 for cars that fail his test. Normal bidders will get good cars only 1/6 of the time.

(d) \$600 for cars that pass his test and \$250 for cars that fail his test. Normal bidders will get good cars only 1/6 of the time.

(e) \$300 for cars that pass his test and \$150 for cars that fail his test. Normal bidders will get good cars only 1/12 of the time.

18.1 This problem will be easier if you have done Problem 18.1. A firm has the production function $f(x_1, x_2) = x_1^{0.90} x_2^{0.30}$. The isoquant on which output is $40^{3/10}$ has the equation

(a) $x_2 = 40x_1^{-3}$.

(b) $x_2 = 40x_1^{3.33}$.

(c) $x_1/x_2 = 3$.

(d) $x_2 = 40x_1^{-0.30}$.

(e) $x_1 = 0.30x_2^{-0.70}$.

18.2 A firm has the production function $f(x, y) = x^{0.70} y^{-0.30}$. This firm has

(a) decreasing returns to scale and dimininishing marginal product for factor x.

(b) increasing returns to scale and decreasing marginal product of factor x.

(c) decreasing returns to scale and increasing marginal product for factor x.

(d) constant returns to scale.

(e) None of the other options are correct.

18.3 A firm uses 3 factors of production. Its production function is $f(x, y, z) = \min\{x^5/y, y^4, (z^6 - x^6)/y^2\}$. If the amount of each input is multiplied by 6, its output will be multiplied by

(a) 7,776.

(b) 1,296.

(c) 216.

(d) 0.

(e) The answer depends on the original choice of x, y, and z.

18.4 A firm has a production function $f(x, y) = 1.20(x^{0.10} + y^{0.10})^1$ whenever $x > 0$ and $y > 0$. When the amounts of both inputs are positive, this firm has

(a) increasing returns to scale.

(b) decreasing returns to scale.

(c) constant returns to scale.

(d) increasing returns to scale if $x + y > 1$ and decreasing returns to scale otherwise.

(e) increasing returns to scale if output is less than 1 and decreasing returns to scale if output is greater than 1.

19.1 In Problem 19.1, the production function is $F(L) = 6L^{2/3}$. Suppose that the cost per unit of labor is 8 and the price of output is 8, how many units of labor will the firm hire?

(a) 128

(b) 64

(c) 32

(d) 192

(e) None of the other options are correct.

19.2 In Problem 19.2, the production function is given by $f(x) = 4x^{1/2}$. If the price of the commodity produced is 70 per unit and the cost of the input is 35 per unit, how much profit will the firm make if it maximizes profit?

(a) 560

(b) 278

(c) 1,124

(d) 545

(e) 283

19.3 The production function is $f(x_1, x_2) = x_1^{1/2} x_2^{1/2}$. If the price of factor 1 is 8 and the price of factor 2 is 16, in what proportions should the firm use factors 1 and 2 if it wants to maximize profits? (See Prob 19.7)

(a) $x_1 = x_2$.

(b) $x_1 = 0.50x_2$.

(c) $x_1 = 2x_2$.

(d) We can't tell without knowing the price of output.

(e) $x_1 = 16x_2$.

19.4 In Problem 19.5, when Farmer Hoglund applies N pounds of fertilizer per acre, the marginal product of fertilizer is $1 - N/200$ bushels of corn. If the price of corn is \$4 per bushel and the price of fertilizer is \$1.20 per pound, then how many pounds of fertilizer per acre should Farmer Hoglund use in order to maximize his profits?

(a) 140

(b) 280

(c) 74

(d) 288

(e) 200

20.1 Suppose that Nadine in Problem 20.1 has a production function $3x_1 + x_2$. If the factor prices are 9 for factor 1 and 4 for factor 2, how much will it cost her to produce 50 units of output?

(a) 1,550

(b) 150

(c) 200

(d) 875

(e) 175

20.2 In Problem 20.2, suppose that a new alloy is invented which uses copper and zinc in fixed proportions, where 1 unit of output requires 3 units of copper and 3 units of zinc for each unit of alloy produced. If no other inputs are needed, the price of copper is 2, and the price of zinc is 2, what is the average cost per unit when 4,000 units of the alloy are produced?

(a) 6.33

(b) 666.67

(c) 0.67

(d) 12

(e) 6,333.33

20.3 In Problem 20.3, the production function is $f(L, M) = 4L^{1/2}M^{1/2}$, where L is the number of units of labor and M is the number of machines used. If the cost of labor is \$25 per unit and the cost of machines is \$64 per unit, then the total cost of producing 6 units of output will be

(a) \$120.

(b) \$267.

(c) \$150.

(d) \$240.

(e) None of the other options is correct.

20.4 Suppose that in the short run, the firm in Problem 20.3 which has production function $F(L, M) = 4L^{1/2}M^{1/2}$ must use 25 machines. If the cost of labor is 8 per unit and the cost of machines is 7 per unit, the short-run total cost of producing 200 units of output is

(a) 1,500.

(b) 1,400.

(c) 1,600.

(d) 1,950.

(e) 975.

20.5 In Problem 20.11, Al's production function for deer is $f(x_1, x_2) = (2x_1 + x_2)^{1/2}$, where x_1 is the amount of plastic and x_2 is the amount of wood used. If the cost of plastic is \$2 per unit and the cost of wood is \$4 per unit, then the cost of producing 8 deer is

(a) \$64.

(b) \$70.

(c) \$256.

(d) \$8.

(e) \$32.

20.6 Two firms, Wickedly Efficient Widgets (WEW)and Wildly Nepotistic Widgets (WNW), produce widgets with the same production function $y = K^{1/2}L^{1/2}$, where K is the input of capital and L is the input of labor. Each company can hire labor at \$1 per unit and capital at \$1 per unit. WEW produces 10 widgets per week, choosing its input combination so as to produce these 10 widgets in the cheapest way possible. WNW also produces 10 widgets per week, but its dotty CEO requires it to use twice as much labor as WEW uses. Given that it must use twice as many laborers as WEW does and must produce the same output, how much larger are WNW's total costs than WEW's?

(a) \$10 per week

(b) \$20 per week

(c) \$15 per week

(d) \$5 per week

(e) \$2 per week

21.1 In Problem 21.2, if Mr. Dent Carr's total costs are $4s^2 + 75s + 60$ and if he repairs 15 cars, his average variable costs will be

(a) 135.

(b) 139.

(c) 195.

(d) 270.

(e) 97.50.

21.2 In Problem 21.3, Rex Carr could pay \$10 for a shovel that lasts one year and pay \$5 a car to his brother Scoop to bury the cars, or he could buy a low-quality car smasher that costs \$200 a year to own and that smashes cars at a marginal cost of \$1 per car. If it is also possible for Rex to buy a high-quality hydraulic car smasher that cost \$300 per year to own and if with this smasher he could dispose of cars at a cost of \$.80 per car, it would be worthwhile for him to buy this high-quality smasher smasher if he plans to dispose of

(a) at least 500 cars per year.

(b) no more than 250 cars per year.

(c) at least 510 cars per year.

(d) no more than 500 cars per year.

(e) at least 250 cars per year.

21.3 Mary Magnolia in Problem 21.4 has variable costs equal to y^2/F where y is the number of bouquets she sells per month and where F is the number of square feet of space in her shop. If Mary has signed a lease for a shop with 1,600 square feet and she is not able to get out of the lease or to expand her store in the short run and if the price of a bouquet is \$3 per unit, how many bouquets per month should she sell in the short run?

(a) 1,600

(b) 800

(c) 2,400

(d) 3,600

(e) 2,640

21.4 Touchie MacFeelie's production function is $.1J^{1/2}L^{3/4}$, where J is the number of old jokes used and L is the number of hours of cartoonists' labor. Touchie is stuck with 900 old jokes for which he paid 6 dollars each. If the wage rate for cartoonists is 5 dollars per hour, then the total cost of producing 24 comics books is

(a) 5,480 dollars.

(b) 2,740 dollars.

(c) 8,220 dollars.

(d) 5,504 dollars.

(e) 1,370 dollars.

21.5 Recall that Touchie McFeelie's production function for comic books is $.1J^{1/2}L^{3/4}$. Suppose that Touchie can vary both jokes and cartoonists' labor. If old jokes cost \$2 each and cartoonists' labor costs \$18 per hour, then the cheapest way to produce comics books requires using jokes and labor in the ratio $J/L =$

(a) 9.

(b) 12.

(c) 3.

(d) 2/3.

(e) 6.

22.1 Suppose that Dent Carr's long-run total cost of repairing s cars per week is $c(s) = 3s^2 + 192$. If the price he receives for repairing a car is 36, then in the long run, how many cars will he fix per week if he maximizes profits?

(a) 6

(b) 0

(c) 12

(d) 9

(e) 18

22.2 In Problem 22.9, suppose that Irma's production function is $f(x_1, x_2) = (\min\{x_1, 2x_2\})^{1/2}$. If the price of factor 1 is $w_1 = 6$ and the price of factor 2 is $w_2 = 4$, then her supply function is

(a) $S(p) = p/16$.

(b) $S(p) = p \max\{w_1, 2w_2\}^2$.

(c) $S(p) = p \min\{w_1, 2w_2\}^2$.

(d) $S(p) = 8p$.

(e) $S(p) = \min\{6p, 8p\}$.

22.3 A firm has the long-run cost function $C(q) = 2q^2 + 8$. In the long run, it will supply a positive amount of output, so long as the price is greater than

(a) 16.

(b) 24.

(c) 4.

(d) 8.

(e) 13.

23.1 In Problem 23.1, if the cost of plaster and labor is \$9 per gnome and everything else is as in the problem, what is the lowest price of gnomes at which there is a positive supply in the long run? (Remember that in order for there to be a positive supply in the long run, producers need to get their money back plus a 10% rate of return on their investment in a gnome mold.)

(a) \$9

(b) \$18

(c) \$11.20

(d) \$9.90

(e) \$10.80

23.2 Suppose that the garden gnome industry was in long-run equilibrium given the circumstances described in Problem 23.1. Suppose, as in Problem 23.2, that it was discovered to everyone's surprise, on January 1, 2001, after it was too late to change orders for gnome molds, that the cost of the plaster and labor needed to make a gnome had changed to 8. If the demand curve does not change, what will happen to the equilibrium price of gnomes?

(a) It rises by \$1.

(b) It falls by \$1.

(c) It stays constant.

(d) It rises by \$8.

(e) It falls by \$4.

23.3 (Hint: For this problem it is useful to draw the demand curve and the short run supply curve.) Suppose that the garden gnome industry were in long run equilibrium as described in Problem 23.1 and that on January 1, 2001, the cost of plaster and labor remained at \$7 per gnome. On January 1, the government unexpectedly introduced a sales tax of \$10 per garden gnome which must be paid by the sellers. Since the gnome molds to be used in 2001 had already been ordered when the tax was announced, producers could not back out on these orders. During the year 2001, what is the (short-run) equilibrium price paid by consumers for garden gnomes?

(a) \$17

(b) \$9.20

(c) \$7

(d) \$10

(e) \$27

23.4 Suppose that the cost of capturing a cockatoo and transporting him to the U.S. is about \$40 per bird. Cockatoos are drugged and smuggled in suitcases to the U.S. Half of the smuggled cockatoos die in transit. Each smuggled cockatoo has a 10% probability of being discovered, in which case the smuggler is fined. If the fine imposed for each smuggled cockatoo is increased to \$900, then the equilibrium price of cockatoos in the U.S. will be

(a) \$288.89.

(b) \$130.

(c) \$85.

(d) \$67.

(e) \$200.

23.5 In Problem 23.13, in the absence of government interference, there is a constant marginal cost of \$5 per ounce for growing marijuana and delivering it to buyers. If the probability that any shipment of marijuana is seized is .20 and the fine if a shipper is caught is \$20 per ounce, then the equilibrium price of marijuana per ounce is

(a) \$11.25.

(b) \$9.

(c) \$25.

(d) \$4.

(e) \$6.

23.6 In Problem 23.8, the supply curve of any firm is $S_i(p) = p/2$. If a firm produces 3 units of output, what are its total variable costs?

(a) \$18

(b) \$7

(c) \$13.50

(d) \$9

(e) There is not enough information given to determine total variable costs.

24.1 In Problem 24.1, if the demand schedule for Bong's book is $Q = 3,000 - 100p$, the cost of having the book typeset is \$10,000, and the marginal cost of printing an extra book is \$4, he would maximize his profits by

(a) having it typeset and selling 1,300 copies.

(b) having it typeset and selling 1,500 copies.

(c) not having it typeset and not selling any copies.

(d) having it typeset and selling 2,600 copies.

(e) having it typeset and selling 650 copies.

24.2 In Problem 24.2, if the demand for pigeon pies is $p(y) = 70 - y/2$, then what level of output will maximize Peter's profits?

(a) 74

(b) 14

(c) 140

(d) 210

(e) None of the above

24.3 A profit-maximizing monopoly faces an inverse demand function described by the equation $p(y) = 70 - y$ and its total costs are $c(y) = 5y$, where prices and costs are measured in dollars. In the past it was not taxed, but now it must pay a tax of \$8 per unit of output. After the tax, the monopoly will

(a) increase its price by \$8.

(b) increase its price by \$12.

(c) increase its price by \$4.

(d) leave its price constant.

(e) None of the other options are correct.

24.4 A firm has invented a new beverage called Slops. It doesn't taste very good, but it gives people a craving for Lawrence Welk's music and Professor Johnson's jokes. Some people are willing to pay money for this effect, so the demand for Slops is given by the equation $q = 14 - p$. Slops can be made at zero marginal cost from old-fashioned macroeconomics books dissolved in bathwater. But before any Slops can be produced, the firm must undertake a fixed cost of 54. Since the inventor has a patent on Slops, it can be a monopolist in this new industry.

(a) The firm will produce 7 units of Slops.

(b) A Pareto improvement could be achieved by having the government pay the firm a subsidy of 59 and insisting that the firm offer Slops at zero price.

(c) From the point of view of social efficiency, it is best that no Slops be produced.

(d) The firm will produce 14 units of Slops.

(e) None of the other options are correct.

25.1 (See Problem 25.1.) If demand in the U.S. is given by $Q_1 = 23,400 - 900p_1$, where p_1 is the price in the U.S. and if the demand in England is given by $2,800 - 200p_2$, where p_2 is the price in England, then the difference between the price charged in England and the price charged in the U.S. will be

(a) 6.

(b) 12.

(c) 0.

(d) 14.

(e) 18.

25.2 (See Problem 25.2.) A monopolist faces a demand curve described by $p(y) = 100 - 2y$ and has constant marginal costs of 16 and zero fixed costs. If this monopolist is able to practice perfect price discrimination, its total profits will be

(a) 1,764.

(b) 21.

(c) 882.

(d) 2,646.

(e) 441.

25.3 A price-discriminating monopolist sells in two separate markets such that goods sold in one market are never resold in the other. It charges 4 in one market and 8 in the other market. At these prices, the price elasticity in the first market is -1.50 and the price elasticity in the second market is -0.10. Which of the following actions is sure to raise the monopolists profits?

(a) Lower p_2.

(b) Raise p_2.

(c) Raise p_1 and lower p_2.

(d) Raise both p_1 and p_2.

(e) Raise p_2 and lower p_1.

25.4 The demand for Professor Bongmore's new book is given by the function $Q = 2,000 - 100p$. If the cost of having the book typeset is 8,000, if the marginal cost of printing an extra copy is 4, and if he has no other costs, which of the following should he do in order to maximize his profits? (Hint: Calculate the number of copies he should sell to maximize his profits if he has the book typeset. Then check whether that outcome is better or worse than not having it typeset at all.)

(a) have it typeset and sell 800 copies.

(b) have it typeset and sell 1,000 copies.

(c) not have it typeset and sell no copies.

(d) have it typeset and sell 1,600 copies.

(e) have it typeset and sell 400 copies.

26.1 Suppose that in Problem 26.2, the demand curve for mineral water is given by $p = 30 - 12q$, where p is the price per bottle paid by consumers and q is the number of bottles purchased by consumers. Mineral water is supplied to consumers by a monopolistic distributor, who buys from a monopolist producer, who is able to produce mineral water at zero cost. The producer charges the distributor a price of c per bottle, where the price c maximizes the producer's total revenue. Given his marginal cost of c, the distributor chooses an output to maximize profits. The price paid by consumers under this arrangement is

(a) 15.

(b) 22.50.

(c) 2.50.

(d) 1.25.

(e) 7.50.

26.2 Suppose that the labor supply curve for a large university in a small town is given by $w = 60 + 0.08L$, where L is number of units of labor per week and w is the weekly wage paid per unit of labor. If the university is currently hiring 1,000 units of labor per week, the marginal cost of an additional unit of labor

(a) equals the wage rate.

(b) is twice the wage rate.

(c) equals the wage rate plus 160.

(d) equals the wage rate plus 80.

(e) equals the wage rate plus 240

26.3 Rabelaisian Restaurants has a monopoly in the town of Upper Duodenum. Its production function is $Q = 40L$, where L is the amount of labor it uses and Q is the number of meals it produces. Rabelaisian Restaurants finds that in order to hire L units of labor, it must pay a wage of $40 + .1L$ per unit of labor. The demand curve for meals at Rabelaisian Restaurants is given by $P = 30.75 - Q/1,000$. The profit-maximizing output for Rabelasian Restaurants is *(a)* 14,000 meals.

(b) 28,000 meals.

(c) 3,500 meals.

(d) 3,000 meals.

(e) 1,750 meals.

27.1 Suppose that the duopolists Carl and Simon in Problem 27.1 face a demand function for pumpkins of $Q = 13,200 - 800P$, where Q is the total number of pumpkins that reach the market and P is the price of pumpkins. Suppose further that each farmer has a constant marginal cost of \$0.50 for each pumpkin produced. If Carl believes that Simon is going to produce Q_s pumpkins this year, then the reaction function tells us how many pumpkins Carl should produce in order to maximize his profits. Carl's reaction function is $R_C(Q_s) =$

(a) $6,400 - Q_s/2$.

(b) $13,200 - 800Q_s$.

(c) $13,200 - 1,600Q_s$.

(d) $3,200 - Q_s/2$.

(e) $9,600 - Q_s$.

27.2 If in Problem 27.4, the inverse demand for bean sprouts were given by $P(Y) = 290 - 4Y$, and the total cost of producing y units for any firm were $TC(Y) = 50Y$ and if the industry consisted of two Cournot duopolists, then in equilibrium each firm's production would be

(a) 30 units.

(b) 15 units.

(c) 10 units.

(d) 20 units.

(e) 18.13 units.

27.3 In Problem 27.5, suppose that Grinch and Grubb go into the wine business in a small country where wine is difficult to grow. The demand for wine is given by $p = \$360 - .2Q$, where p is the price and Q is the total quantity sold. The industry consists of just the two Cournot duopolists, Grinch and Grubb. Imports are prohibited. Grinch has constant marginal costs of \$15 and Grubb has marginal costs of \$75. How much is Grinch's output in equilibrium?

(a) 675

(b) 1,350

(c) 337.50

(d) 1,012.50

(e) 2,025

27.4 In Problem 27.6, suppose that two Cournot duopolists serve the Peoria-Dubuque route, and the demand curve for tickets per day is $Q = 200 - 2p$ (so $p = 100 - Q/2$). Total costs of running a flight on this route are $700+40q$ where q is the number of passengers on the flight. Each flight has a capacity of 80 passengers. In Cournot equilibrium, each duopolist will run one flight per day and will make a daily profit of

(a) 100.

(b) 350.

(c) 200.

(d) 200.

(e) 2,400.

27.5 In Problem 27.4, suppose that the market demand curve for bean sprouts is given by $P = 880 - 2Q$, where P is the price and Q is total industry output. Suppose that the industry has two firms, a Stackleberg leader and a follower. Each firm has a constant marginal cost of \$80 per unit of output. In equilibrium, total output by the two firms will be

(a) 200.

(b) 100.

(c) 300.

(d) 400.

(e) 50.

27.6 There are two firms in the blastopheme industry. The demand curve for blastophemes is given by $p = 2,100 - 3q$. Each firm has one manufacturing plant and each firm i has a cost function $C(q_i) = q_i^2$, where q_i is the output of firm i. The two firms form a cartel and arrange to split total industry profits equally. Under this cartel arrangement, they will maximize joint profits if *(a)* and only if each firm produces 150 units in its plant.

(b) they produce a total of 300 units, no matter which firm produces them.

(c) and only if they each produce a total of 350 units.

(d) they produce a total of 233.33 units, no matter which firm produces them.

(e) they shut down one of the two plants, having the other operate as a monopoly and splitting the profits.

28.1 (See Problem 28.1.) Alice and Betsy are playing a game in which each can play either of two strategies, "leave" or "stay". If both play the strategy "leave", then each gets a payoff of \$100. If both play the strategy "stay" then each gets a payoff of \$200. If one plays "stay" and the other plays "leave", then the one who plays "stay" gets a payoff of \$$C$ and the one who plays "leave" gets a payoff of \$$D$. When is the outcome where both play "leave" a Nash equilibrium.

(a) Never, since \$200 > \$100

(b) When $100 > C$ and $D > 200$ but not when $200 > D$

(c) When $D > C$ and $C >$ \$100

(d) Whenever $D < 200$

(e) Whenever $100 > C$

28.2 (See Problem 28.2.) A small community has 10 people, each of whom has a wealth of \$1,000. Each individual must choose whether to contribute \$100 or \$0 to the support of public entertainment for the community. The money value of the benefit that a person gets from this public entertainment is 0.8 times the total amount of money contributed by individuals in the community.

(a) This game has a Nash equilibrium in which 5 people contribute \$100 for public entertainment and 5 people contribute nothing.

(b) This game has no Nash equilibrium in pure strategies but has a Nash equilibrium in mixed strategies.

(c) This game has two Nash equilibria, one in which everybody contributes \$100 and one in which nobody contributes \$100.

(d) This game has a dominant strategy equilibrium in which all 10 citizens contribute \$100 to support public entertainment.

(e) This game has a dominant strategy equilibrium in which nobody contributes anything for public entertainment.

28.3 (See Problem 28.2.) A small community has 10 people, each of whom has a wealth of \$1,000. Each individual must choose whether to contribute \$100 or \$0 to the support of public entertainment for the community. The money value of the benefit that a person gets from this public entertainment is b times the total amount of money contributed by individuals in the community.

(a) If $10b > 1$, everybody is better off if all contribute to the public entertainment fund than if nobody contributes, but if $10b < 1$, everybody is better off if nobody contributes than if all contribute.

(b) Everybody is worse off if all contribute than if nobody contributes if $b > 1$, but if $b < 1$, everybody is better off if nobody contributes.

(c) If $10b > 1$, there is a dominant strategy equilibrium in which everybody contributes.

(d) has a dominant strategy equilibrium in which nobody contributes for public entertainment.

(e) In order for there to be a dominant strategy equilibrium in which all contribute, it must be that $b > 10$.

28.4 (See Problem 28.4, the Stag Hunt.) Two partners start a business. Each has two possible strategies. Spend full time or secretly take a second job and spend only part time on the business. Any profits that the business makes will be split equally between the two partners, regardless of whether they work full time or part time for the business. If a partner takes a second job, he will earn \$50,000 from this job plus his share of profits from the business. If he spends full time on the business, his only source of income is his share of profits from this business. If both partners spend full time on the business, total profits will be \$200,000. If one partner spends full time on the business and the other takes a second job, the business profits will be \$80,000. If both partners take second jobs, the total business profits are \$20,000.

(a) This game has two Nash equilibria, one in which each partner has an income of \$100,000 and one in which each partner has an income of \$60,000.

(b) In the only Nash equilibrium for this game, one partner earns \$90,000 and the other earns \$50,000.

(c) In the only Nash equilibrium for this game, both partners earn \$100,000.

(d) In the only Nash equilibrium for this game, both partners earn \$60,000.

(e) This game has no pure strategy Nash equilibria but has a mixed strategy equilibrium.

28.5 (See the Maynard's Cross problem, 28.7.) If the number of persons who attend the club meeting this week is X, then the number of people who will attend next week is $27 + 0.70X$. What is a long-run equilibrium attendance for this club?

(a) 27

(b) 38.57

(c) 54

(d) 90

(e) 63

29.1 (See Problem 29.2.) Arthur and Bertha are asked by their boss to vote on a company policy. Each of them will be allowed to vote for one of three possible policies, A, B, and C. Arthur likes A best, B second best, and C least. Bertha likes B best, A second best, and C least. The money value to Arthur of outcome C is 0, outcome B is 1, and outcome A is 3. The money value to Bertha of outcome C is 0, outcome B is 3, and outcome A is 1. The boss likes outcome C best, but if Arthur and Bertha both vote for one of the other outcomes, he will pick the outcome they voted for. If Arthur and Bertha vote for different outcomes, the boss will pick C. Arthur and Bertha know this is the case. They are not allowed to communicate with each other, and each decides to use a mixed strategy in which each randomizes between voting for A or for B. What is the mixed strategy equilibrium for Arthur and Bertha in this game?

(a) Arthur and Bertha each votes for A with probability 1/2 and for B with probability 1/2.

(b) Arthur votes for A with probability 2/3 and for B with probability 1/3. Bertha votes for A with probability 1/3 and for B with probability 2/3.

(c) Arthur votes for A with probability 3/4 and for B with probability 1/4. Bertha votes for A with probability 1/4 and for B with probability 3/4.

(d) Arthur votes for A with probability 4/5 and for B with probability 1/5. Bertha votes for A with probability 1/5 and for B with probability 4/5.

(e) Arthur votes for A and Bertha votes for B.

29.2 (See Problem 29.3.) Two players are engaged in a game of Chicken. There are two possible strategies. Swerve and Drive Straight. A player who chooses to Swerve is called "Chicken" and gets a payoff of zero, regardless of what the other player does. A player who chooses to Drive Straight gets a payoff of 32 if the other player swerves and a payoff of -48 if the other player also chooses to Drive Straight. This game has two pure strategy equilibria and

(a) a mixed strategy equilibrium in which each player swerves with probability .60 and drives straight with probability .40.

(b) two mixed strategies in which players alternate between swerving and driving straight.

(c) a mixed strategy equilibrium in which one player swerves with probability .60 and the other swerves with probability .40.

(d) a mixed strategy in which each player swerves with probability .30 and drives straight with probability .70.

(e) no mixed strategies.

29.3 (See Problem 29.6.) Big Pig and Little Pig have two possible strategies, Press the Button, and Wait at the Trough. If both pigs choose Wait, both get 4. If both pigs press the button then Big Pig gets 5 and Little Pig gets 5. If Little Pig presses the button and Big Pig waits, then Big Pig gets 10 and Little Pig gets 0. Finally, if Big Pig presses and Little Pig waits, then Big Pig gets 4 and Little Pig gets 2. In Nash equilibrium,

(a) Little Pig will get a payoff of 2 and Big Pig will get a payoff of 4.

(b) Little Pig will get a payoff of 5 and Big Pig will get a payoff of 5.

(c) both pigs will wait at the trough.

(d) Little Pig will get a payoff of zero.

(e) the pigs must be using mixed strategies.

29.4 (See Problem 29.7) The old Michigan football coach has only two strategies: run the ball to the left side of the line, and run the ball to the right side. The defense can concentrate either on the left side or the right side of Michigan's line. If the opponent concentrates on the wrong side, Michigan is sure to gain at least 5 yards. If the defense defends the left side and Michigan runs left, Michigan will be stopped for no gain. But if the opponent defends the right side when Michigan runs right, Michigan will gain at least 5 yards with probability .40. It is the last play of the game and Michigan needs to gain 5 yards to win. Both sides choose Nash equilibrium strategies. In Nash equilibrium, Michigan would

(a) be sure to run to the right side.

(b) run to the right side with probability .63.

(c) run to the right side with probability .77.

(d) run with equal probability to one side or the other.

(e) run to the right side with probability 0.60.

29.5 Suppose that in the Hawk-Dove game discussed in Problem 29.8, the payoff to each player is -4 if both play Hawk. If both play Dove, the payoff to each player is 1 and if one plays Hawk and the other plays Dove, the one that plays Hawk gets a payoff of 3 and the one that plays Dove gets 0. In equilibrium, we would expect Hawks and Doves to do equally well. This happens when the proportion of the total population that plays Hawk is

(a) 0.33.

(b) 0.17.

(c) 0.08.

(d) 0.67.

(e) 1.

30.1 Remember Darryl Dawdle from Problem 30.1. Suppose that Darryl's writing assignment will take 9 hours to complete and that Darryl's preferences about writing over the next three days are given by the utility function

$$U(x_t, x_{t+1}, x_{t+2}) = -x_t^2 - \frac{1}{3}x_{t+1}^2 - \frac{1}{5}x_{t+2}^2,$$

where x_t, x_{t+1}, and x_{t+2} are the amounts of time spent writing in periods t, $t+1$, and $t+2$ respectively. If Darryl could commit himself in advance to allocate his writing time so as to maximize the above utility function, How much time would he spend writing on Monday, Tuesday, and Wednesday?

(a) .5 hour Monday, 2.5 hours Tuesday, 6 hours Wednesday

(b) 1 hour Monday, 3 hours Tuesday, 5 hours Wednesday

(c) 3 hours Monday, 3 hours Tuesday, 3 hours Wednesday

(d) 2 hours Monday, 4 hours Tuesday, 5 hours Wednesday

(e) 2 hours Monday, 3 hours Tuesday, 4 hours Wednesday

30.2 When Tuesday comes around, Darryl from the previous problem makes a new decision about how to how to allocate his time. He uses the utility function of the previous problem, but now period t is Tuesday. What fraction of the remaining amount of work on his assignment will he do on Tuesday and what fraction on Wednesday?

(a) 3/8 on Tuesday, 5/8 on Wednesday

(b) 2/5 on Tuesday, 3/5 on Wednesday

(c) 1/3 on Tuesday, 2/3 on Wednesday

(d) 1/4 on Tuesday, 3/4 on Wednesday

30.3 Will Powers has a sweet tooth but wants to stay slim. He lives with his mother, who cooks great chocolate chip cookies. Will loves chocolate chip cookies but realizes that if he eats too many, he will get fat. Will's preferences about cookie-eating represent a tradeoff between his enjoyment from eating a cookie and the fact that eating too many will make him pudgy. The only time that he ever eats cookies is after dinner. When he has not eaten any cookies for several hours, his preferences are represented by the utility function $U(X) = 8X - 2X^2$ where X is the number of cookies to be eaten. But when Will is actually eating cookies, he finds that the more cookies he eats, the stronger his craving for them. If he has just eaten Y cookies, then his preferences for eating a total of X cookies is given by the utility function $U(X,Y) = (8+3Y)X - 2X^2$. Suppose that Will has just finished dinner and has not yet eaten any cookies. Will asks his mother for exactly the number of cookies that he currently prefers, how many cookies is that?

(a) 2 cookies

(b) 3 cookies

(c) 4 cookies

(d) 8 cookies

(e) 16 cookies

30.4 Recall Will Powers from the previous question. Suppose that after dinner his mother asks him if he wants her to put the whole cookie jar in front of him and let him eat as many as he wants. Would Will eat more than 6 cookies before he stops? Before he starts eating cookies, Will's mother asks him whether he would rather that she give him exactly 1 cookie or that she put the cookie jar on the table and let him take as many as he wants, one-by-one. Which option will he prefer?

(a) He'd eat less than 6 if given the cookie jar, and he prefers being given the cookie jar to being given just 1 cookie.

(b) He'd eat more than 6 if given the cookie jar, and he prefers being given the cookie jar to being given just 1 cookie.

(c) He'd eat more than 6 if given the cookie jar, but he would rather be given just 1 cookie.

(d) He'd eat less than 6 if given the cookie jar, but he would rather be given just 1 cookie.

30.5 At the beginning of any time Period t, Arnold's preferences over consumption in the next three periods are given by the utility function

$$U(x_t, x_{t+1}, x_{t+2}) = x_1 + \frac{1}{2}x_2 + \frac{1}{3}x_3$$

where x_t is consumption in period t, x_{t+1} is consumption in period $t+1$ and x_{t+2} is consumption in Period 3. At the beginning of Period 1, he has \$1000 and he knows that at the beginning of Period 2, he will receive a gift of \$1000. At the beginning of Period 1, he can sign a binding agreement that will require him to invest this \$1000 in a project that will give \$1800 in Period 3. He has no other opportunities to borrow or lend. If he signs the agreement, his consumption over time will be $(x_1, x_2, x_3) = (\$1000, 0, \$1800)$. If he does not sign the agreement his consumption will be $(x_1, x_2, x_3) = (\$1000, \$1000, 0)$. Will he choose to sign the agreement in Period 1? In Period 2 will he wish that he had not signed this agreement?

(a) Yes and yes.

(b) No and yes.

(c) No and no.

(d) Yes and no.

31.1 An economy has two people Charlie and Doris. There are two goods, apples and bananas. Charlie has an initial endowment of 3 apples and 12 bananas. Doris has an initial endowment of 6 apples and 6 bananas. Charlie's utility function is $U(A_C, B_C) = A_C B_C$, where A_C is his apple consumption and B_C is his banana consumption. Doris's utility function is $U(A_D, B_D) = A_D B_D$, where A_D and B_D are her apple and banana consumptions. At every Pareto optimal allocation,

(a) Charlie consumes the same number of apples as Doris.

(b) Charlie consumes 9 apples for every 18 bananas that he consumes.

(c) Doris consumes equal numbers of apples and bananas.

(d) Charlie consumes more bananas per apple than Doris does.

(e) Charlie consumes apples and bananas in the ratio of 6 apples for every 6 bananas that he consumes.

31.2 In Problem 31.4, Ken's utility function is $U(Q_K, W_K) = Q_K W_K$ and Barbie's utility function is $U(Q_B, W_B) = Q_B W_B$. If Ken's initial endowment were 3 units of quiche and 10 units of wine and Barbie's initial endowment were 6 units of quiche and 10 units of wine, then at any Pareto optimal allocation where both persons consume some of each good,

(a) Ken would consume 3 units of quiche for every 10 units of wine.

(b) Barbie would consume twice as much quiche as Ken.

(c) Ken would consume 9 units of quiche for every 20 units of wine that he consumed.

(d) Barbie would consume 6 units of quiche for every 10 units of wine that she consumed.

(e) None of the other options are correct.

31.3 In Problem 31.1, suppose that Morris has the utility function $U(b, w) = 6b + 24w$ and Philip has the utility function $U(b, w) = bw$. If we draw an Edgeworth box with books on the horizontal axis and wine on the vertical axis and if we measure Morris's consumptions from the lower left corner of the box, then the contract curve contains *(a)* a straight line running from the upper right corner of the box to the lower left.

(b) a curve that gets steeper as you move from left to right.

(c) a straight line with slope 1/4 passing through the lower left corner of the box.

(d) a straight line with slope 1/4 passing through the upper right corner of the box.

(e) a curve that gets flatter as you move from left to right.

31.4 In Problem 31.2, Astrid's utility function is $U(H_A, C_A) = H_A C_A$. Birger's utility function is $\min\{H_B, C_B\}$. Astrid's initial endowment is no cheese and 4 units of herring, and Birger's initial endowments are 6 units of cheese and no herring. Where p is a competitive equilibrium price of herring and cheese is the numeraire, it must be that demand equals supply in the herring market. This implies that

(a) $6/(p+1)+2=4$.

(b) $6/4=p$.

(c) $4/6=p$.

(d) $6/p+4/2p=6$.

(e) $\min\{4,6\}=p$.

31.5 Suppose that in Problem 31.8, Mutt's utility function is $U(m, j) = \max\{3m, j\}$ and Jeff's utility function is $U(m, j) = 2m + j$. Mutt is initially endowed with 4 units of milk and 2 units of juice. Jeff is initially endowed with 4 units of milk and 6 units of juice. If we draw an Edgeworth box with milk on the horizontal axis and juice on the vertical axis and if we measure goods for Mutt by the distance from the lower left corner of the box, then the set of Pareto optimal allocations includes the

(a) left edge of the Edgeworth box but no other edges.

(b) bottom edge of the Edgeworth box but no other edges.

(c) left edge and bottom edge of the Edgeworth box.

(d) right edge of the Edgeworth box but no other edges.

(e) right edge and top edge of the Edgeworth box.

31.6 In Problem 31.3, Professor Nightsoil's utility function, is $U_N(B_N, P_N) = B_N + 4P_N^{1/2}$ and Dean Interface's utility function is $U_I(B_I, P_I) = B_I + 2P_I^{1/2}$. If Nightsoil's initial endowment is 7 bromides and 15 platitudes and if Interface's initial endowment is 7 bromides and 25 platitudes, then at any Pareto efficient allocation where both persons consume positive amounts of both goods, it must be that

(a) Nightsoil consumes the same ratio of bromides to platitudes as Interface.

(b) Interface consumes 8 platitudes.

(c) Interface consumes 7 bromides.

(d) Interface consumes 3 bromides.

(e) Interface consumes 5 platitudes.

32.1 Suppose that in Problem 32.1, Tip can write 5 pages of term papers or solve 20 workbook problems in an hour, while Spot can write 2 pages of term papers or solve 6 workbook problems in an hour. If they each decide to work a total of 7 hours and to share their output then if they produce as many pages of term paper as possible given that they produce 30 workbook problems,

(a) Spot will spend all of his time writing term papers and Tip will spend some time at each task.

(b) Tip will spend all of his time writing term papers and Spot will spend some time at each task.

(c) both students will spend some time at each task.

(d) Spot will write term papers only and Tip will do workbook problems only.

(e) Tip will write term papers only and Spot will do workbook problems only.

32.2 Al and Bill are the only workers in a small factory that makes geegaws and doodads. Al can make 3 geegaws per hour or 15 doodads per hour. Bill can make 2 geegaws per hour or 6 doodads per hour. Assuming that neither of them finds one task more odious than the other,

(a) Al has a comparative advantage in producing geegaws and Bill has a comparative advantage in producing doodads.

(b) Bill has a comparative advantage in producing geegaws and Al has a comparative advantage in producing doodads.

(c) Al has comparative advantage in producing both geegaws and doodads.

(d) Bill has a comparative advantage in producing both geegaws and doodads.

(e) Both have a comparative advantage in producing doodads.

32.3 (See Problem 32.5.) Every consumer has a red-money income and a blue-money income, and each commodity has a red price and a blue price. You can buy a good by paying for it either with blue money at the blue price or with red money at the red price. Harold has 10 units of red money and 18 units of blue money to spend. The red price of ambrosia is 1 and the blue price of ambrosia is 2. The red price of bubble gum is 1 and the blue price of bubble gum is 1. If ambrosia is on the horizontal axis, and bubblegum on the vertical, axis, then Harold's budget set is bounded

(a) by two line segments, one running from (0,28) to (10,18) and another running from (10,18) to (19,0).

(b) by two line segments one running from (0,28) to (9,10) and the other running from (9,10) to (19,0).

(c) by two line segments, one running from (0,27)to (10,18) and the other running from (10,18) to (20,0).

(d) a vertical line segment and a horizontal line segment, intersecting at (10,18).

(e) a vertical line segment and a horizontal line segment, intersecting at (9,10).

32.4 (See Problem 32.2.) Robinson Crusoe has exactly 12 hours per day to spend gathering coconuts or catching fish. He can catch 4 fish per hour or he can pick 16 coconuts per hour. His utility function is $U(F, C) = FC$, where F is his consumption of fish and C is his consumption of coconuts. If he allocates his time in the best possible way between catching fish and picking coconuts, his consumption will be the same as it would be if he could buy fish and coconuts in a competitive market where the price of coconuts is 1 and

(a) his income is 192, and the price of fish is 4.

(b) his income is 48, and the price of fish is 4.

(c) his income is 240, and the price of fish is 4.

(d) his income is 192, and the price of fish is 0.25.

(e) his income is 120, and the price of fish is 0.25.

32.5 On a certain island there are only two goods, wheat and milk. The only scarce resource is land. There are 1,000 acres of land. An acre of land will produce either 16 units of milk or 37 units of wheat. Some citizens have lots of land; some have just a little bit. The citizens of the island all have utility functions of the form $U(M, W) = MW$. At every Pareto optimal allocation, *(a)* the number of units of milk produced equals the number of units of wheat produced.

(b) total milk production is 8,000.

(c) all citizens consume the same commodity bundle.

(d) every consumer's marginal rate of substitution between milk and wheat is -1.

(e) None of the above is true at *every* Pareto optimal allocation.

33.1 A Borda count is used to decide an election between 3 candidates, x, y, and z where a score of 1 is awarded to a first choice, 2 to a second choice and 3 to a third choice. There are 25 voters: 7 voters rank the candidates x first, y second, and z third; 4 voters rank the candidates x first, z second, and y third; 6 rank the candidates z first, y second, and x third; 8 voters rank the candidates, y first, z second, and x third. Which candidate wins?

(a) Candidate x.

(b) Candidate y.

(c) Candidate z.

(d) There is a tie between x and y, with z coming in third.

(e) There is a tie between y and z, with x coming in third.

33.2 A parent has two children living in cities with different costs of living. The cost of living in city B is 3 times the cost of living in city A. The child in city A has an income of 3,000 and the child in city B has an income of \$9,000. The parent wants to give a total of \$4,000 to her two children. Her utility function is $U(C_A, C_B) = C_A C_B$, where C_A and C_B are the consumptions of the children living in cities A and B respectively. She will choose to give

(a) each child \$2,000, even though this will buy less goods for the child in city B.

(b) the child in city B 3 times as much money as the child in city A.

(c) the child in city A 3 times as much money as the child in city B.

(d) the child in city B 1.50 times as much money as the child in city A.

(e) the child in city A 1.50 times as much money as the child in city B.

33.3 Suppose that Paul and David from Problem 33.7 have utility functions $U = 5A_P + O_P$ and $U = A_D + 5O_D$, respectively, where A_P and O_P are Paul's consumptions of apples and oranges and A_D and O_D are David's consumptions of apples and oranges. The total supply of apples and oranges to be divided between them is 8 apples and 8 oranges. The "fair" allocations consist of all allocations satisfying the following conditions.

(a) $A_D = A_P$ and $O_D = O_P$.

(b) $10A_P + 2O_P$ is at least 48, and $2A_D + 10O_D$ is at least 48.

(c) $5A_P + O_P$ is at least 48, and $2A_D + 5O_D$ is at least 48.

(d) $A_D + O_D$ is at least 8, and $A_S + O_S$ is at least 8.

(e) $5A_P + O_P$ is at least $A_D + 5O_D$, and $A_D + 5O_D$ is at least $5A_P + O_P$.

33.4 Suppose that Romeo in Problem 33.8 has the utility function $U = S_R^8 S_J^4$ and Juliet has the utility function $U = S_R^4 S_J^8$, where S_R is Romeo's spaghetti consumption and S_J is Juliet's. They have 96 units of spaghetti to divide between them.

(a) Romeo would want to give Juliet some spaghetti if he had more than 48 units of spaghetti.

(b) Juliet would want to give Romeo some spaghetti if she had more than 62 units.

(c) Romeo and Juliet would never disagree about how to divide the spaghetti.

(d) Romeo would want to give Juliet some spaghetti if he had more than 60 units of spaghetti.

(e) Juliet would want to give Romeo some spaghetti if she had more than 64 units of spaghetti.

33.5 Hatfield and McCoy burn with hatred for each other. They both consume corn whiskey. Hatfield's utility function is $U = W_H - W_M^{2/8}$ and McCoy's utility is $U = W_M - W_H^{2/8}$, where W_H is Hatfield's whiskey consumption and W_M is McCoy's whiskey consumption, measured in gallons. The sheriff has a total of 28 gallons of confiscated whiskey that he could give back to them. For some reason, the sheriff wants them both to be as happy as possible, and he wants to treat them equally. The sheriff should give them each

(a) 14 gallons.

(b) 4 gallons and spill 20 gallons in the creek.

(c) 2 gallons and spill 24 gallons in the creek.

(d) 8 gallons and spill the rest in the creek.

(e) 1 gallon and spill the rest in the creek.

34.1 Suppose that in Horsehead, Massachusetts, the cost of operating a lobster boat is \$3,000 per month. Suppose that if X lobster boats operate in the bay, the total monthly revenue from lobster boats in the bay is $\$1,000(23x - x^2)$. If there are no restrictions on entry and new boats come into the bay until there is no profit to be made by a new entrant, then the number of boats that enter will be X_1. If the number of boats that operate in the bay is regulated to maximize total profits, the number of boats in the bay will be X_2.

(a) $X_1 = 20$ and $X_2 = 20$.

(b) $X_1 = 10$ and $X_2 = 8$.

(c) $X_1 = 20$ and $X_2 = 10$.

(d) $X_1 = 24$ and $X_2 = 14$.

(e) None of the other options are correct.

34.2 An apiary is located next to an apple orchard. The apiary produces honey and the apple orchard produces apples. The cost function of the apiary is $C_H(H, A) = H^2/100 - 1A$ and the cost function of the apple orchard is $C_A(H, A) = A^2/100$, where H and A are the number of units of honey and apples produced respectively. The price of honey is 8 and the price of apples is 7 per unit. Let A_1 be the output of apples if the firms operate independently, and let A_2 be the output of apples if the firms are operated by a single owner. It follows that

(a) $A_1 = 175$ and $A_2 = 350$.

(b) $A_1 = A_2 = 350$.

(c) $A_1 = 200$ and $A_2 = 350$.

(d) $A_1 = 350$ and $A_2 = 400$.

(e) $A_1 = 400$ and $A_2 = 350$.

34.3 Martin's utility is $U(c, d, h) = 2c + 5d - d^2 - 2\bar{h}$, where d is the number of hours per day that he spends driving around, $\bar{h}$ is the *average* number of hours per day of driving per person in his home town, and c is the amount of money he has left to spend on other stuff besides gasoline and auto repairs. Gas and auto repairs cost \$.50 per hour of driving. All the people in Martin's home town have the same tastes. If each citizen believes that his own driving will not affect the amount of driving done by others, they will all drive D_1 hours per day. If they all drive the same amount, they would all be best off if each drove D_2 hours per day. Solve for D_1 and D_2.

(a) $D_1 = 2$ and $D_2 = 1$.

(b) $D_1 = D_2 = 2$.

(c) $D_1 = 4$ and $D_2 = 2$.

(d) $D_1 = 5$ and $D_2 = 0$.

(e) $D_1 = 24$ and $D_2 = 0$.

34.4 (See Problems 34.8 and 34.9.) An airport is located next to a housing development. Where X is the number of planes that land per day and Y is the number of houses in the housing development, profits of the airport are $22X - X^2$ and profits of the developer are $32Y - Y^2 - XY$. Let H_1 be the number of houses built if a single profit-maximizing company owns the airport and the housing development. Let H_2 be the number of houses built if the airport and the housing development are operated independently and the airport has to pay the developer the total "damages" XY done by the planes to developer's profits. Then

(a) $H_1 = H_2 = 14$.

(b) $H_1 = 14$ and $H_2 = 16$.

(c) $H_1 = 16$ and $H_2 = 14$.

(d) $H_1 = 16$ and $H_2 = 15$.

(e) $H_1 = 15$ and $H_2 = 19$.

34.5 (See Problem 34.5.) A clothing store and a jeweler are located side by side in a shopping mall. If the clothing store spends C dollars on advertising and the jeweler spends J dollars on advertising, then the profits of the clothing store will be $(48 + J)C - 2C^2$ and the profits of the jeweler will be $(42 + C)J - 2J^2$. The clothing store gets to choose its amount of advertising first, knowing that the jeweler will find out how much the clothing store advertised before deciding how much to spend. The amount spent by the clothing store will be *(a)* 16.71 dollars.

(b) 46 dollars

(c) 69 dollars.

(d) 11.50 dollars.

(e) 34.50 dollars.

35.1 If the demand function for the DoorKnobs operating system is related to perceived market share s and actual market share t by the equation $p = 512s(1 - x)$, then in the long run, the highest price at which DoorKnobs could sustain a market share of 3/4 is

(a) \$156.

(b) \$64.

(c) \$96.

(d) \$128.

(e) \$256.

35.2 Eleven consumers are trying to decide whether to connect to a new communications network. Consumer 1 is of type 1, consumer 2 is of type 2, consumer 3 is of type 3, and so on. Where k is the number of consumers connected to the network (including oneself), a consumer of type n has a willingness to pay to belong to this network equal to k times n. What is the highest price at which 7 consumers could all connect to the network and either make a profit or at least break even?

(a) \$40

(b) \$33

(c) \$25

(d) \$40

(e) \$35

35.3 Professor Kremepuff's new, user-friendly textbook has just been published. This book will be used in classes for two years, after which it will be replaced by a new edition. The publisher charges a price of p_1 in the first year and p_2 in the second year. After the first year, bookstores buy back used copies for $p_2/2$ and resell them to students in the second year for p_2. (Students are indifferent between new and used copies.) The cost to a student of owning the book during the first year is therefore $p_1 - p_2/2$. In the first year of publication, the number of students willing to pay \$$v$ to own a copy of the book for a year is $60,000 - 1,000v$. The number of students taking the course in the first year who are willing to pay \$$w$ to keep the book for reference rather than sell it at the end of the year is $60,000 - 5,000w$. The number of persons who are taking the course in the second year and are willing to pay at least \$$p$ for a copy of the book is $50,000 - 1,000p$. If the publisher sets a price of p_1 in the first year and of $p_2 \leq p_1$ in the second year, then the total number of copies of the book that the publisher sells over the two years will be

(a) $120,000 - 1,000p_1 - 1,000p_2$.

(b) $120,000 - 1,000(p_1 - p_2/2)$.

(c) $120,000 - 3,000p_2$.

(d) $110,000 - 1,000(p_1 + p_2/2)$.

(e) $110,000 - 1,500p_2$.

36.1 Just north of the town of Muskrat, Ontario, is the town of Brass Monkey, population 500. Brass Monkey, like Muskrat, has a single public good, the town skating rink, and a single private good, Labatt's ale. Everyone's utility function is $U_i(X_i, Y) = X_i - 64/Y$, where X_i is the number of bottles of ale consumed by i and Y is the size of the skating rink in square meters. The price of ale is \$1 per bottle. The cost of the skating rink to the city is \$5 per square meter. Everyone has an income of at least \$5,000. What is the Pareto efficient size for the town skating rink?

(a) 80 square meters

(b) 200 square meters

(c) 100 square meters

(d) 165 square meters

(e) None of the other options are correct.

36.2 Recall Bob and Ray in Problem 36.4. They are thinking of buying a sofa. Bob's utility function is $U_B(S, M_B) = (1 + S)M_B$ and Ray's utility function is $U_R(S, M_R) = (4+S)M_R$, where $S = 0$ if they don't get the sofa and $S = 1$ if they do and where M_B and M_R are the amounts of money they have respectively to spend on their private consumptions. Bob has a total of \$800 to spend on the sofa and other stuff. Ray has a total of \$2,000 to spend on the sofa and other stuff. The maximum amount that they could pay for the sofa and still arrange for both be better off than without it is

(a) \$1,200.

(b) \$500.

(c) \$450.

(d) \$800.

(e) \$1,600.

36.3 Recall Bonnie and Clyde from Problem 36.5. Suppose that their total profits are $48H$, where H is the number of hours they work per year. Their utility functions are, respectively, $U_B(C_B, H) = C_B - 0.01H^2$ and $U_C(C_C, H) = C_C - 0.01H^2$, where C_B and C_C are their private goods consumptions. If they find a Pareto optimal choice of hours of work and income distribution, it must be that the number of hours they work per year is

(a) 1,300.

(b) 1,800.

(c) 1,200.

(d) 550.

(e) 650.

36.4 Recall Lucy and Melvin from Problem 36.6. Lucy's utility function is $2X_L + G$, and Melvin's utility function is $X_M G$, where G is their expenditures on the public goods they share in their apartment and where X_L and X_M are their respective private consumption expenditures. The total amount they have to spend on private goods and public goods is 32,000. They agree on a Pareto optimal pattern of expenditures in which the amount that is spent on Lucy's private consumption is 8,000. How much do they spend on public goods?

(a) 8,000

(b) 16,000

(c) 8,050

(d) 4,000

(e) There is not enough information here to be able to determine the answer.

37.1 As in Problem 37.2, suppose that low-productivity workers have marginal products of 10 and high-productivity workers have marginal products of 16. The community has equal numbers of each type of worker. The local community college offers a course in microeconomics. High-productivity workers think taking this course is as bad as a wage cut of 4, and low-productivity workers think it is as bad as a wage cut of 7.

(a) There is a separating equilibrium in which high-productivity workers take the course and are paid 16 and low-productivity workers do not take the course and are paid 10.

(b) There is no separating equilibrium and no pooling equilibrium.

(c) There is no separating equilibrium, but there is a pooling equilibrium in which everybody is paid 13.

(d) There is a separating equilibrium in which high-productivity workers take the course and are paid 20 and low-productivity workers do not take the course and are paid 10.

(e) There is a separating equilibrium in which high-productivity workers take the course and are paid 16 and low-productivity workers are paid 13.

37.2 Suppose that in Enigma, Ohio, Klutzes have a productivity of $1,000 and Kandos have productivity of $5,000 per month. You can't tell Klutzes from Kandos by looking at them or asking them, and it is too expensive to monitor individual productivity. Kandos, however, have more patience than Klutzes. Listening to an hour of dull lectures is as bad as losing $200 for a Klutz and $100 for a Kando. There will be a separating equilibrium in which anybody who attends a course of H hours of lectures is paid $5,000 per month and anybody who does not is paid $1,000 per month

(a) if $20 < H < 40$.

(b) if $20 < H < 80$.

(c) for all positive values of H.

(d) only in the limit as H approaches infinity.

(e) if $H < 35$ and $H > 17.50$.

37.3 In Rustbucket, Michigan, there are 200 used cars for sale. Half of them are good, and half of them are lemons. Owners of lemons are willing to sell them for \$300. Owners of good used cars are willing to sell them for prices above \$1,100 but will keep them if the price is lower than \$1,100. There is a large number of potential buyers who are willing to pay \$400 for a lemon and \$2,100 for a good car. Buyers can't tell good cars from bad, but original owners know.

(a) There will be an equilibrium in which all used cars sell for \$1,250.

(b) The only equilibrium is one in which all used cars on the market are lemons and they sell for \$400.

(c) There will be an equilibrium in which lemons sell for 300 and good used cars sell for \$1,100.

(d) There will be an equilibrium in which all used cars sell for \$700.

(e) There will be an equilibrium in which lemons sell for \$400 and good used cars sell for \$2,100.

37.4 Suppose that in Burnt Clutch, Pennsylvania., the quality distribution of the 1,000 used cars on the market is such that the number of used cars of value less than V is $V/2$. Original owners must sell their used cars. Original owners know what their cars are worth, but buyers can't determine a car's quality until they buy it. An owner can either take his car to an appraiser and pay the appraiser \$100 to appraise the car (accurately and credibly), or he can sell the car unappraised. In equilibrium, car owners will have their cars appraised if and only if their car's value is at least

(a) \$100.

(b) \$500.

(c) \$300.

(d) \$200.

(e) \$400.

Answers to Quizzes

Chapter 2: Budget Constraint

2.1 C
2.2 A
2.3 B
2.4 C
2.5 C
2.6 A
2.7 B

Chapter 3: Preferences

3.1 E
3.2 C
3.3 B
3.4 D
3.5 B
3.6 E

Chapter 4: Utility

4.1 E
4.2 B
4.3 C
4.4 C
4.5 E
4.6 C

Chapter 5: Choice

5.1 A
5.2 E
5.3 D
5.4 B
5.5 B
5.6 D

Chapter 6: Demand

6.1 A
6.2 D
6.3 D
6.4 A
6.5 E
6.6 B
6.7 C

Chapter 7: Revealed Preference

7.1 B
7.2 C
7.3 A
7.4 A
7.5 A

Chapter 8: Slutsky Equation

8.1 A
8.2 C
8.3 C
8.4 C
8.5 A
8.6 C

Chapter 9: Buying and Selling

9.1 D
9.2 A
9.3 B
9.4 E
9.5 B
9.6 D

Chapter 10: Intertemporal Choice

10.1 B
10.2 B
10.3 B
10.4 E
10.5 A
10.6 C

Chapter 11: Asset Markets

11.1 A
11.2 A
11.3 D
11.4 A
11.5 C
11.6 A

Chapter 12: Uncertainty

12.1 A
12.2 B
12.3 C
12.4 A
12.5 B

Chapter 13: Risky Assets

13.1 C
13.2 A

Chapter 14: Consumer's Surplus

14.1 A
14.2 A
14.3 B
14.4 A
14.5 A

Chapter 15: Market Demand

15.1 D
15.2 E
15.3 C
15.4 A
15.5 E

Chapter 16: Equilibrium

16.1 D
16.2 C
16.3 A
16.4 A

Chapter 17: Auctions

17.1 D
17.2 D
17.3 B
17.4 A
17.5 A

Chapter 18: Technology

18.1 A
18.2 A
18.3 B
18.4 B

Chapter 19: Profit Maximization

19.1 B
19.2 A
19.3 C
19.4 A

Chapter 20: Cost Minimization

20.1 B
20.2 D
20.3 A
20.4 E
20.5 A
20.6 D

Chapter 21: Cost Curves

21.1 A
21.2 A
21.3 C
21.4 A
21.5 E

Chapter 22: Firm Supply

22.1 B
22.2 A
22.3 D

Chapter 23: Industry Supply

23.1 C
23.2 C
23.3 A
23.4 A
23.5 A
23.6 D

Chapter 24: Monopoly

24.1 A
24.2 E
24.3 C
24.4 B

Chapter 25: Monopoly Behavior

25.1 A
25.2 A
25.3 B
25.4 A

Chapter 26: Factor Markets

26.1 B
26.2 D
26.3 A

Chapter 27: Oligopoly

27.1 A
27.2 D
27.3 A
27.4 A
27.5 C
27.6 A

Chapter 28: Game Theory

28.1 E
28.2 E
28.3 A
28.4 A
28.5 D

Chapter 29: Game Applications

29.1 C
29.2 A
29.3 C
29.4 B
29.5 A

Chapter 30: Behavioral Economics

30.1 B
30.2 E
30.3 A
30.4 C
30.5 D

Chapter 31: Exchange

31.1 B
31.2 C
31.3 D
31.4 A
31.5 B
31.6 B

Chapter 32: Production

32.1 A
32.2 B
32.3 A
32.4 A
32.5 B

Chapter 33: Welfare

33.1 A
33.2 B
33.3 B
33.4 E
33.5 A

Chapter 34: Externalities

34.1 C
34.2 D
34.3 A
34.4 B
34.5 A

Chapter 35: Information Technology

35.1 C
35.2 E
35.3 E

Chapter 36: Public Goods

36.1 A
36.2 D
36.3 C
36.4 B

Chapter 37: Information

37.1 A
37.2 A
37.3 A
37.4 D