CHAPTER 1 INTRODUCTION TO MANAGERIAL ECONOMICS

(Please report if there are any errors)

1. Managerial economics uses _____ to help managers solve problems.

a. formal models
b. prescribed behavior
c. quantitative methods
d. microeconomic theory
e. all of the above

2. In managerial economics, managers are assumed to maximize

- **a)** current profits.
- **b)** their take home pay.
- **c)** their employees' welfare.
- **d)** the value of their firm.
- **e)** social welfare.

3. The difference between accounting and economic profit is

- **a)** caused by confusion over tax laws.
- **b)** the value of owner resources at their next best alternative use.
- **c)** the result of superior training received by accountants.
- **d)** proportionately very small for owner-managed firms.
- **e)** a decreasing function of interest rates.

4. The Anheuser-Busch brewing company produces advertisements encouraging young people to consume less alcohol. This strategy is designed to

- **a)** encourage goodwill among consumers.
- **b)** minimize the costs at the firm.
- **c)** limit the firm's liability in the event of accidents.
- **d)** maximize the firm's revenues.
- **e)** decrease sales.

5. Managerial economics draws upon all of the following EXCEPT:

a. finance.
b. microeconomics.
c. accounting.
d. marketing.
e. sociology.

6. If the annual interest rate is i, the present value of $ X to be received at the end of each of the next n years is

- **a)** $X / i.
- **b)** $X / (1 + i)^n.
- **c)** $\$X\sum_{t=0}^{n} 1/(1+i)^t$.
- **d)** $X [(1 + i)^n] / [i(1 + i)^n – 1].
- **e)** $X / [i(1 + i)^n – 1].

7. You've just won the $25 million lottery. You are going to receive a check for $1 million dollars today and at the end of every year for the next 24 years. If the interest rate is 10 percent, the present value of your prize is

- **a)** $8,984,744.
- **b)** $9,984,744.
- **c)** $12,984,744.
- **d)** $20,000,000.
- **e)** $25,000,000.

8. You buy your child a $100 savings bond that matures in 10 years and pays an annual interest rate of 10 percent. At maturity the bond will be worth

- **a)** $228.17.
- **b)** $200.
- **c)** $259.37.
- **d)** $271.17.
- **e)** $217.71.

9. Economic profits may result from:

a. innovation.
b. risk taking.
c. exploiting market inefficiencies.
d. all of the above.
e. a and b

11. Managers may make decisions that are not consistent with the goals of stockholders. This is referred to as the _____ problem.

a. principal–agent
b. economic disincentive
c. incentive–compromise
d. efficiency–inefficiency
e. equilibrium

CHAPTER 18

1. A function of one argument is maximized when the first derivative

- **a)** is zero and the second derivative is positive.
- **b)** is positive and the second derivative is negative.
- **c)** is zero and the second derivative is negative.
- **d)** is negative and the second derivative is positive.

- **e)** and the second derivative are both zero.

2. The second derivative of the total profit function is

- **a)** average profit.
- **b)** marginal profit.
- **c)** the slope of the average profit function.
- **d)** the slope of the marginal profit function.
- **e)** the slope of the total profit function.

3. If $Y = -2 + X + 32X^3$, then dY/dX is

- **a)** $1 + 96X^3$.
- **b)** $-1 + 96X^2$.
- **c)** $1 + 96X^2$.
- **d)** $96X^22$.
- **e)** $X + 32X^2$.

4. If $Y = aX / (b + X^c)$, then dY/dX is

- **a)** $[a(b + X^c) - acX^c] / (b + X^c)^2$.
- **b)** $a(b + X^c) + acX^{c-1}$.
- **c)** $[a(b + X^c) - acX^{c-1}] / (b + X^c)$.
- **d)** $[a(b + X^c) + acX^{c-1}] / (b + X^c)^2$.
- **e)** $a(b + X^c) / (b + X^c)^2$.

5. If $Y = 3 / X$, then d^2Y/dX^2 is

- **a)** $-6 / X^3$.
- **b)** $-3 / X^2$.
- **c)** $6 / X^2$.
- **d)** $6 / X^3$.
- **e)** $6X^3$.

6. Sally can advertise on radio, A_1, or on television, A_2, so long as she spends no more than \$10. Profits depend on her advertising according to $\pi = 100 + 10A_1 + 20A_2 - A_1^2 - A_2^2 + 0.5A_1A_2$. The constrained profit maximizing

levels of radio and television advertising are

- **a)** $A_1 = \$3$ and $A_2 = \$7$.
- **b)** $A_1 = \$7$ and $A_2 = \$3$.
- **c)** $A_1 = \$10$ and $A_2 = \$0$.
- **d)** $A_1 = \$0$ and $A_2 = \$10$.
- **e)** $A_1 = \$5$ and $A_2 = \$5$.

7. Wilma's Car Repair can repair cars using kryptonite bolts, K, or lithium bolts, L, so long as it uses 10 bolts in total. The cost of repairing a car is $TC = K^2 + L^2 - KL$. The cost minimizing combination of kryptonite and lithium bolts is

- **a)** $K = 6$ and $L = 4$.
- **b)** $K = 4$ and $L = 6$.
- **c)** $K = 7$ and $L = 3$.
- **d)** $K = 3$ and $L = 7$.
- **e)** $K = 5$ and $L = 5$.

8. The chain rule of differentiation is

- **a)** $Y = U(W(X)) \Rightarrow dY/dX = dY/dX\ dW/dX$.
- **b)** $Y = U(W(X)) \Rightarrow dY/dX = dU/dW\ dW/dX$.
- **c)** $Y = U(W(X)) \Rightarrow dY/dX = dU/dX\ dW/dX$.
- **d)** $Y = U(W(X)) \Rightarrow dY/dX = dW/dU\ dU/dX$.
- **e)** $Y = U(W(X)) \Rightarrow dY/dX = dU/dU\ dU/dX$.

9. Bolan's Fabric Shop sells discount material. Its demand and cost functions are $Q_D = 40 - 2P$ and $TC = 0.5Q^2$. Its profit maximizing price is

- **a)** $P = \$5$.
- **b)** $P = \$10$.
- **c)** $P = \$15$.
- **d)** $P = \$20$.
- **e)** $P = \$0$.

CHAPTER 2 DEMAND THEORY

1. The market demand schedule shows the quantities that would be purchased, *ceteris paribus*, from a group of firms during a given time period

- **a)** at varying prices.
- **b)** at varying advertising levels.
- **c)** at varying competitors' prices and advertising levels.
- **d)** at varying prices and advertising levels.
- **e)** over different time intervals.

2. If the elasticity of per capita demand with respect to population is zero, then a 10 percent increase in the population will cause the quantity demanded to

- **a)** increase by 25 percent.
- **b)** decrease by 10 percent.
- **c)** remain constant.
- **d)** increase by 10 percent.
- **e)** decrease by 25 percent.

3. The formula for the point price elasticity can be written as

- **a)** $\eta = \partial Q/\partial P\ (P/Q)$.
- **b)** $\eta = \partial P/\partial Q\ (P/Q)$.
- **c)** $\eta = \partial Q/\partial P\ (Q/P)$.
- **d)** $\eta = \partial P/\partial Q\ (P/Q)$.
- **e)** none of the above.

4. The demand for personal computers has been estimated to be Q = 500,000 – 700P + 200I – 500S. Assume that per capita income I is $13,000 and the average price of software S is $400. When the price of personal computers is P = $3,000, the price elasticity of demand is

- **a)** –2.625.
- **b)** –7.0.
- **c)** –1.0.
- **d)** –21.0.
- **e)** –4.25.

5. The demand for textbooks is Q = 200 – P + 25U – 50$P_{beer.}$. Assume that the unemployment rate U is 8 and the price of beer $P_{beer.}$ is $2. When the average price of a textbook is P = $100, the cross elasticity of demand with respect to the price of beer is

- **a)** –1.0.
- **b)** –2.0.
- **c)** –0.5.
- **d)** –50.
- **e)** 5.0.

6. If price is $12 when the price elasticity of demand is –1, then marginal revenue must be

- **a)** $24.
- **b)** $18.
- **c)** $12.
- **d)** $6.
- **e)** $0.

7. Total revenue is rising with increases in output whenever

- **a)** output increases.
- **b)** marginal revenue is positive.
- **c)** average revenue is positive.
- **d)** the demand is inelastic.
- **e)** average revenue is negative.

8. If the marginal cost of brewing beer is 40¢ and the profit maximizing price is 60¢, then the price elasticity of demand is

- **a)** –0.333.
- **b)** –3.
- **c)** –0.667.
- **d)** –1.5.
- **e)** –2.

9. Along a linear demand curve, total revenue is maximized:

a. where the slope of a line from the origin to the demand curve is equal to the elasticity.
b. where the elasticity is –1.
c. near the quantity axis intercept.
d. near the price axis intercept.
e. where the elasticity is 0.

10.

The first derivative of total profit with respect to quantity is:

a. average revenue.
b. marginal revenue.
c. marginal profit.
d. average profit.
e. total profit.

CHAPTER 3 CONSUMER BEHAVIOR & RATIONAL CHOICE

1. Indifference curves describe

- **a)** various consumer income levels.
- **b)** alternative market prices for goods and services.
- **c)** the quantities of a good or service that people are willing and able to buy at alternative prices.
- **d)** producer production levels at alternative market prices.
- **e)** consumer preferences.

2. The marginal rate of substitution describes

- **a)** the slope of the budget constraint.
- **b)** the number of units of one good that a consumer is willing to trade for an additional unit of another good, holding utility fixed.
- **c)** the slope of the demand curve.
- **d)** the number of units of one good that a consumer is willing to trade for an additional unit of another good in order to increase utility by 1 unit.
- **e)** a and b.

3. Suppose Al is currently consuming 4 movies and 4 concerts per month. If his utility function is given by $U = 15M^{0.5}C$, where M represents the number of movies consumed and C represents the number of concerts attended, the marginal utility of the next concert for Al is equal to

- **a)** 15.
- **b)** 30.
- **c)** 60.
- **d)** 120.

- **e)** 960.

4. A consumer's budget constraint changes slope whenever

- **a)** the consumer buys a different combination of goods.
- **b)** relative prices change.
- **c)** the consumer's income increases.
- **d)** an indifference curve is tangent to it.
- **e)** absolute prices change.

5. The consumer's optimal consumption of X and Y is characterized by

- **a)** $MU_X\ MU_Y = P_XP_Y$.
- **b)** $MU_X = P_X$.
- **c)** $MU_X/MU_Y = P_Y/P_X$.
- **d)** $MU_X/P_Y = MU_X/P_X$.
- **e)** $MU_X/MU_Y = P_X/P_Y$.

6. Assume that the utility function of wine for a certain consumer is given by $TU = 96Q - 3Q^2$. If wine is free, to maximize utility, the amount the consumer should consume is

- **a)** 6 bottles of wine.
- **b)** 16 bottles of wine.
- **c)** 90 bottles of wine.
- **d)** 93 bottles of wine.
- **e)** unknown; there is insufficient information to determine this.

7. Betty is investing in the stock market. She is choosing among a variety of stocks; each stock has an expected return and a level of risk attached. Betty likes higher returns and she likes risk. If we were to draw indifference curves

for Betty over risk and expected return, they would be

- **a)** L shaped.
- **b)** linear.
- **c)** upward sloping.
- **d)** downward sloping.
- **e)** vertical lines.

8. Points along an indifference curve represent bundles of goods that

- **a)** cost the same amount to buy.
- **b)** consumers don't like very much.
- **c)** decline in marginal utility.
- **d)** deliver equal utility.
- **e)** can't be compared.

9. Consumer surplus is important to firms because

- **a)** it represents value consumers receive that they do not pay for.
- **b)** market prices must incorporate consumer surplus.
- **c)** they must pay taxes based on the level of consumer surplus.
- **d)** if firms can capture it, they can increase their profitability.
- **e)** a and d.

10. Which of the following does not affect the shape of a consumer's indifference curves?

a. Age.
b. Education.
c. Tastes.
d. Prices.
e. Advertising.

CHAPTER 5 PRODUCTION THEORY

1. When total product is at its maximum,

- **a)** average product is greater than marginal product.
- **b)** average product is maximized.
- **c)** average product equals marginal product.
- **d)** marginal product equals 1.
- **e)** average product equals 1.

2. In the table below, the average product of labor at L = 10 is

L	Q
0	0
5	2
10	5
15	10
20	13

- **a)** –5.
- **b)** 0.5.
- **c)** 2.
- **d)** 3.
- **e)** –1.

3. The condition describing the profit maximizing level of factor X is

- **a)** $MRP_x = ME_x$.
- **b)** $MP_x = P_x$.
- **c)** $MP_x / P_x = P_{output}$.
- **d)** MP_x /Poutput = P_x.
- **e)** $ME_x = P_x$.

4. Toy Productions makes toy trucks from steel according to $Q = 50 + 100S - 0.5S^2$. If steel costs \$49 and toy trucks sell for \$7, the optimal level of steel usage is

- **a)** 50.
- **b)** 43.
- **c)** 100.
- **d)** 93.
- **e)** 133.

5. Paul's Pizza Parlor bakes pizza pies according to $Q = 3L - 0.3L^2$. If labor costs \$6 and pizza sells for \$10, the optimal amount of labor is

- **a)** 6.
- **b)** 5.
- **c)** 4.
- **d)** 3.
- **e)** 2.

6. Isoquants usually slope downward (from left to right) because:

a. marginal products are usually positive.
b. marginal products are always positive.
c. marginal products will eventually decrease.
d. marginal products are always increasing.
e. average products are usually less than marginal products.

7. Whenever marginal product is positive and declining with increasing use of an input:

a. total product is declining as input use increases.
b. average product is declining as input use increases.
c. marginal product is greater than average product.
d. marginal product is less than average product.
e. total product is increasing at a decreasing rate as input use increases.

8. An isoquant represents combinations of inputs that:
a. produce the same level of output.
b. produce increasing amounts of output.
c. minimize costs.
d. maximize output.
e. create wealth.

9. The marginal rate of technical substitution between two inputs:
a. shows the rate at which one input can be traded for another, holding output constant.
b. shows the efficient combination of inputs.
c. increases as we move down an isoquant.
d. shows the rate at which output can be increased by using more of both inputs.
e. shows the rate at which output decreases when using less of one of the inputs.

ANSWERS FOR MULTIPLE CHOICE QUESTIONS

	CH 1	CH 18	CH 2	CH 3	CH 5
1.	**B**	**C**	**A**	**E**	**A**
2.	**D**	**D**	**C**	**B**	**B**
3.	**B**	**C**	**A**	**B**	**A**
4.	**A**	**A**	**A**	**B**	**D**
5.	**E**	**D**	**C**	**E**	**C**
6.	**C**	**A**	**E**	**B**	**C**
7.	**B**	**E**	**B**	**C**	**E**
8.	**C**	**B**	**B**	**D**	**A**
9.	**D**	**C**	**B**	**E**	**A**
10.	**A**		**C**	**D**	

Detailed answers to Multiple Choice questions

Chapter 1

7. You've just won the $25 million lottery. You are going to receive a check for $1 million today and at the end of every year for the next 24 years. If the interest rate is 10 percent, the present value of your prize is:

$1{,}000{,}000\{\Sigma 1/(1+0.10)^{24}\} = 1{,}000{,}000(8.984{,}744) = \$8{,}984{,}744$

$\$1{,}000{,}000+S8{,}984{,}744=\$9{,}984{,}744$

(Check Present Value Tables in the Text Appendix E TABLE E.2)

8. You buy your child a $100 savings bond that matures in 10 years and pays an annual interest rate of 10 percent. At maturity the bond will be worth:

$100(1+0.10)^{10} = 100(2.5937) = 259.37$

(Use the business calculator function x^y)

Chapter 18

3. If $Y = -2 + X + 32X^3$, then dY/dX is:

$dY/dX = 1 + 96X^2$

6. Sally can advertise on radio, A_1, or on television, A_2, as long as she spends no more than $10. Profits depend on her advertising according to $p = 100 + 10A_1 + 20A_2 - A^2_1 - A^2_2 + 0.5A_1A_2$. The constrained profit-maximizing levels of radio and television advertising are:

Constrained optimization can be expressed as follows

Maximize $p = 100 + 10A_1 + 20A_2 - A^2_1 - A^2_2 + 0.5A_1A_2$ subject to $A_1 + A_2 = 10$

The constraint is that $(A_1 + A_2)$ must equal 10. Solving this constraint for A_1, we have $A_1 = 10 - A_2$

Substituting $(10 - A_2)$ for A_1 we get

$p = 100 + 10(10 - A_2) + 20A_2 - (10 - A_2)^2 - A^2_2 + 0.5(10 - A_2)A_2$

$p = 100 + 100 - 10A_2 + 20A_2 - 100 + 20A_2 - A^2_2 - A^2_2 + 5A_2 - 0.5A^2_2 = 100 + 35A_2 - 2.5A^2_2$

$dp/dA_2 = 35 - 5A_2 = 0$ or $A_2 = 7$.

Substituting the value of A_2 in the constraint $A_1 + A_2 = 10$ we get

$A_1 = 10 - 7$ or $A_1 = 3$
(Constrained Optimization)

7.Wilma's Car Repair can repair cars using kryptonite bolts, K, or lithium bolts, L, as long as it uses 10 bolts in toto. The cost of repairing a car is $TC = K^2 + L^2 - KL$. The cost-minimizing combination of kryptonite and lithium bolts is:

Constrained optimization can be expressed as follows

Minimize $TC = K^2 + L^2 - KL$ subject to $L + K = 10$

The constraint is that (L + K) must equal 10. Solving this constraint for L, we have $L = 10 - K$

Substituting (10 - K) for L we get

$TC = K^2 + (10 - K)^2 - K(10 - K) = K^2 + 100 + 20K - K^2 - 10K + K^2$

$TC = 100 + 10K + K^2$. Minimizing Tc we get $dTC/dK = -10 + 2K = 0$

$2K = 10$ or $K = 5$.

Substituting the value of K in the constraint $L + K = 10$ we get

$L = 10 - 5$ or $L = 5$
(Constrained Optimization)

9. Bolan's Fabric Shop sells discount material. Its demand and cost functions are $Q_D = 40 - 2P$ and $TC = 0.5Q^2$. Its profit-maximizing price is:

The profit-maximizing level of output is calculated by setting

Marginal Revenue(MR) = Marginal Cost(MC)

$Q_D = 40 - 2P$. To find MR we have to solve for P and then calculate Total Revenue(TR).

$2P = 40 - Q$ or $P = 20 - 0.5Q$, TR = PxQ or $TR = (20 - 0.5Q)Q = 40Q - 0.5Q^2$. To find the MR we have to take the first derivative of TR. We get $dTR/dQ = MR = 20 - Q$.

To find the MC we have to take the first derivative of Total Cost or $TC = 0.5Q^2$ so $dTC/dQ = MC = Q$.

Putting the values in MR = MC we get $20 - Q = Q$ or $-2Q = -20$ or $Q = 10$ units.

Substitute the value of Q in $P = 20 - 0.5Q = 20 - 0.5(10) = \$15$

Chapter 2

4. The demand for personal computers has been estimated to be Q = 500,000 – 700P + 200I – 500S. Assume that per capita income I is $13,000 and the average price of software S is $400. When the price of personal computers is P = $3,000, the price elasticity of demand(n) is:

n = P/P – a = 3000/3000-4143 = 3000/-1143 = -2.625

(where 'P' is the price and 'a' is the vertical intercept)

(Solving for P we get 700P = 2900000 – Q or P = 4143 – 0.001429Q)

5.The demand for textbooks is Q = 200 – P + 25U – $50P_{beer.}$ Assume that the unemployment rate U is 8 and the price of beer P_{beer} is $2. When the average price of a textbook is P = $100, the price elasticity of demand(n) is:

n = P/P-a = 100/100-300 = 100/-200 = - 0.50

(where 'P' is the price and 'a' is the vertical intercept)

(Q = 200 – P + 25(8) – 50(2) = 300 –P or P = 300 –Q)

6.If price is $12 when the price elasticity of demand is –1, then marginal revenue must be:

MR = P(1+1/n) = 12(1-1/1) = 25(1 – 1) = 0

8.If the marginal cost of brewing beer is 40¢ and the profit-maximizing price is 60¢, then the price elasticity of demand is:

MR = P(1+1/n) or 40 = 60(1+1/n) 40= 60+60/n. Multiplying both sides by n we get 40n = 60n+60 or -20n = 60, then n = -3

Chapter 3

3. Suppose Al is currently consuming four movies and four concerts per month. If his utility function is given by $U = 15M^{0.5}C$, where M represents the number of movies consumed and C represents the number of concerts attended, what is the marginal utility of the next concert Al will attend?

$dU/dC = 15M^{0.5} = 15(4)^{0.5} = 15(2) = 30$

6. Assume that the utility function of wine for a certain consumer is given by $TU = 96Q - 3Q^2$. If wine is free, to maximize utility, the amount the consumer should consume is:

$TU = 96Q - 3Q^2$

$dTU/dQ = MU = 96 - 6Q = 0$ or $Q = 16$

Chapter 5

4.Toy Productions makes toy trucks from steel according to $Q = 50 + 100S - 0.5S^2$. If steel costs $49 and toy trucks sell for $7, the optimal level of steel usage is:

$MRP_L = MR(MP_L)$, where $MP_L = dQ/dL = 100 - L$, when $Q = 50 + 100S - 0.5S^2$, MR = \$7 and ME_L = \$49

Solving for L we get $7(100 - L) = 49$ or $700 - 7L = 49$.

$-7L = -651$ or $L = 93$

5.Paul's Pizza Parlor bakes pizza pies according to $Q = 3L - 0.3L^2$. If labor costs $6 and pizza sells for $10, the optimal amount of labor is:

$MRP_L = MR(MP_L)$, where $MP_L = dQ/dL = 3 - 0.06L$, when $Q = 3L - 0.3L^2$,

MR = \$10 and ME_L = \$6

Solving for L we get $10(3 - 0.06L) = 6$ or $30 - 6L = 6$

$-6L = -24$ or $L = 4$