
print name

Midterm Exam

30% of course grade

ECON 3800-001, Spring 2002, Managerial Economics

chapters 1 through 9 as well as Appendices A and B

INSTRUCTIONS:

- 1.** There are 21 multiple-choice questions, but the exam will be graded as if there only are 20 questions.
- 2.** As with all multiple-choice tests, you should select the best answer, which may be the "wrong" answer. For example, the "correct" answer may be 2.2; however your exam may only offer the answer options of 2.0 and 3.0; in which case the best answer is 2.0.
Round down towards 0.0 if .0, .1, .2, .3, or .4 and round up towards 1.0 if .5, .6, .7, .8, or .9.
- 3.** Because this is a multiple-choice exam, there is no partial credit for your math work.
- 4.** Each student is encouraged to challenge any single question or group of questions as having a mathematically incorrect answer on the answer key. Challenges of mathematically incorrect must be done before the end of business on **Friday, March 15** and may be done orally (face-to-face appointments are preferred, but voice mail is permissible).
- 5.** With respect to questions a student believes are **ambiguous**, because there is a built in curve of one extra question, a student **must appeal two or more questions** as being ambiguous. Appeals are due before the end of business on **Friday, March 15**. Appeals must be in writing and signed. Appeals must direct the instructor to specific textbook pages and/or handout pages that support the student's version of the challenged ambiguity.

QUESTIONS:

1. **First, find the optimum values of**

$$TC^* = \underline{\hspace{2cm}} \quad Q_1^* = \underline{\hspace{2cm}} \quad Q_2^* = \underline{\hspace{2cm}} \quad \lambda^* = \underline{\hspace{2cm}}$$

using the Lagrangian constrained optimization method.

When

$$TC = 100 + Q_1^2 Q_2 + Q_1 Q_2^2$$

and when

$$Q_1 + Q_2 = 10.$$

Second, select the best answer from below.

(hint: if you need the quadratic equation you made an error.)

- a. $Q_1^* = 4.$
- b. $TC^* = 425$ if $Q_1^* + Q_2^* = 11.$
- c. $(\partial^2 L_{TC} / \partial \lambda^2) > 0$ at TC^*
- d. $\lambda^* = 0 = 10 - Q_1 - Q_2.$

- 2. When discounting future dollar values back into present dollar values:**
- the present value may be bigger or may be smaller than the future value
 - the Rule of 70 only can be used when both the interest rate and the years to doubling are known.
 - the present value always will be bigger than the future value.
 - inflation is more relevant than the interest rate.
- 3. Which of the following is TRUE?**
- The Major Forces of Change of 1500 no longer are changing the world.
 - The MES (Minimum Efficient Size) during the Free Capitalism stage of the History of Capitalism was a small MES in both absolute terms and relative terms.
 - The government element of capitalism has the function of regulating self-interest.
 - The prices element of capitalism has the function of coordinating self-interest.
- 4. Included in both the non-price determinants of supply and the non-price determinants of demand is/are:**
- expectations.
 - technology.
 - cost of inputs.
 - tastes.
- 5. Which statement is TRUE about elasticity of demand graphs?**
- If the demand curve is horizontal, then (like a normal demand curve) the elasticity is the same at all points on the demand curve, but equals infinity.
 - If the demand curve is vertical, then (like a normal demand curve) the elasticity is different at each point on the demand curve, but equals infinity.
 - If the seller's price is at unitary elasticity, then the seller will profit maximize.
 - If the demand elasticity is greater than one, then the seller should decrease price to increase total revenue.

- 6. Which of the following is NOT an equation for the elasticity of demand?**
- $\eta = - (1 / b) * ([a - bQ] / Q)$.
 - $\eta = - (dQ / dP) (P / Q)$.
 - $\eta = - (\Delta Q [P1 + P2]) / (\Delta P [Q1 + Q2])$.
 - $\eta = - (\% \Delta Q / \% \Delta P)$.
- 7. The sign (i.e., + or -) on an estimated elasticity has a meaning. Which of the following correctly states the sign and its meaning?**
- The elasticity of demand is negative on normal goods.
 - The cross elasticity of demand is negative on substitute goods.
 - The income elasticity is negative on inferior goods.
 - The advertising elasticity is negative on the most effective advertising.
- 8. The marginal rate of substitution:**
- is not the same at every point on an indifference curve.
 - at the optimum point, is equal to the slope of the budget constraint.
 - $= - (P_x / P_y)$ at the optimum point.
 - All of the above are true.
- 9. Which of the following is TRUE?**
- The identification problem always is present in time series data.
 - A market experiment that uses rebate coupons focuses on seller's cost minimization.
 - One advantage of a market experiment is that it eliminates the identification problem.
 - None of the above is true.
- 10. Which of the following is NOT an assumption used in multiple linear regressions?**
- The e_i are randomly distributed, that is, the distribution of the e_i fits under a normal curve.
 - $(\sum e_i / n) = 0$; that is, the e_i have a mean of zero (no heteroskedasticity).
 - $e_i \neq f(e_j)$; that is, the e_i are distributed independently of the e_j (no autocorrelation).
 - $X_i \neq f(X_j)$; that is, the X_i are distributed independently of the X_j (no multicollinearity).

- 11. Which of the following statements is TRUE about R^2 and R^2 adjusted?**
- Neither the R^2 statistic nor the R^2 adjusted statistic can be statistically significant (e.g., 95% confidence interval).
 - The R^2 always is smaller than the R^2 adjusted.
 - The R^2 is better with a multiple regression than with a simple regression.
 - The R^2 adjusted is adjusted by subtracting the standard deviation from the R^2 .
- 12. Which of the following is TRUE about the t test and the F test?**
- The t test is a substitute for the z test when the degrees of freedom are less than infinity.
 - The t test explains the percent of the variation in the e_i .
 - The F test is a better test than the t test in a simple regression.
 - The F test is a better measure of the statistical significance of an individual variable than is the t test.
- 13. Which is FALSE about one-tailed tests and two-tailed tests?**
- If there are no prior studies or if there are no other basis to suspect a specific value or range of values for the estimated value of X_i , then a two-tailed test should be used.
 - A one-tailed test is less accurate than a two-tailed test.
 - Each tail in a two-tailed test at the 90% level of significance contains the same percentage of observations as the single tail of a one-tailed test at the 95% level of significance.
 - Since neither price nor quantity can really take a negative value, if the estimated value is "close" to zero, then the one-tailed test should be used instead of the two-tailed test.

- 14. Which of the following is TRUE about time series and dummy variables?**
- Seasonal variables must be dummy variables.
 - An identification problem will exist if any one of the dummy variables is excluded.
 - The estimated value of a dummy variable is the percent of the population which was scored as "1".
 - All of the above are true.
- 15. Which of the following statements is TRUE regarding the relationships between average, marginal, and total values?**
- The total is optimized when the average equals zero.
 - The marginal is optimized when the total equals zero.
 - The average is optimized when the marginal equals zero.
 - The average is optimized when the average equals the marginal.
- 16. If the LONG RUN production function takes the form**

$$Q = 5 L^{0.4} K^{0.9}$$
then:
- the law of diminishing marginal returns does NOT apply to this production function.
 - this production function exhibits increasing returns to scale.
 - if both labor and capital are increased by 1%, then output will increase by more than 1%.
 - All of the above are true.
- 17. The marginal rate of technical substitution (MRTS):**
- is the same at all points on all isoquant curves.
 - is the same at all points on all isocost curves.
 - $= (P_Y / P_X)$ only when $(P_Y / P_X) = (MP_Y / MP_X)$.
 - is another name for the marginal rate of substitution.
- 18. Which of the following is TRUE about productivity and learning curves?**
- Labor productivity is a better measure of productivity than is total factor productivity.
 - Technological change is measured by holding constant the production function.
 - Gains from learning are measured by $C = a + bQ$ where b is the slope of the learning curve.
 - None of the above is true.

19. Which of the following are TRUE about parallel development efforts, project selection, and diffusion?

- a. Parallel development efforts involve simultaneous pursuit of multiple pathways to discovery of technological change; and each pathway is followed to its conclusion before selecting the best pathway.
- b. Project selection typically yields more value as a result of forcing managers to make explicit their assumptions required for achieving success, than project selection yields value as a result of accurate estimates of value fed into quantitative decision tools.
- c. Diffusion typically is slower when the network for diffusion already exists for the process and/or the diffusion increases profit and/or the investment required for diffusion is "small".
- d. None of the above is true.

20. If the SHORT RUN production function is

$$TC = 100 + 2Q + 0.1Q^2$$

and if

$$Q = 5$$

then:

- a. the variable costs are 113.
- b. if also $P = 11$, then the firm should shut down.
- c. the marginal costs are 2.
- d. the average total costs are 31.

21. Which of the following are FALSE?

- a. In the long run the value of fixed costs is zero.
- b. The MES is found on the long run average total cost curve.
- c. Using the survivor method to estimate MES is superior because it provides a direct measure of long run average total cost.
- d. For firm sizes smaller than the MES, bigger is cheaper. However, for firm sizes larger than the MES, bigger costs the same or more; but firm sizes larger than MES probably reduce competition.