

- 8 Describe the use of sensitivity analysis and postoptimality analysis in analyzing the results.
- 9 Managers are quick to claim that quantitative analysts talk to them in a jargon that does not sound like English. List four terms that might not be understood by a manager. Then explain in nontechnical terms what each term means.
- 10 Why do you think many quantitative analysts don't like to participate in the implementation process? What could be done to change this attitude?
- 11 Should people who will be using the results of a new quantitative model become involved in the technical aspects of the problem-solving procedure?
- 12 C. W. Churchman once said that "mathematics ... tends to lull the unsuspecting into believing that he who thinks elaborately thinks well." Do you think that the best QA models are the ones that are most elaborate and complex mathematically? Why?
- 13 What is the break-even point? What parameters are necessary to find it?

Problems

-  14 Gina Fox has started her own company, Foxy Shirts, which manufactures imprinted shirts for special occasions. Since she has just begun this operation, she rents the equipment from a local printing shop when necessary. The cost of using the equipment is \$350. The materials used in one shirt cost \$8, and Gina can sell these for \$15 each.
- (a) If Gina sells 20 shirts, what will her total revenue be? What will her total variable cost be?
 - (b) How many shirts must Gina sell to break even? What is the total revenue for this?
-  15 Ray Bond sells handcrafted yard decorations at county fairs. The variable cost to make these is \$20 each, and he sells them for \$50. The cost to rent a booth at the fair is \$150. How many of these must Ray sell to break even?
-  16 Ray Bond, from Problem 15, is trying to find a new supplier that will reduce his variable cost of production to \$15 per unit. If he was able to succeed in reducing this cost, what would the break-even point be?
-  17 Katherine D'Ann is planning to finance her college education by selling programs at the football games for State University. There is a fixed cost of \$400 for printing these programs, and the variable cost is \$3. There is also a \$1,000 fee that is paid to the university for the right to sell these programs. If Katherine was able to sell programs for \$5 each, how many would she have to sell in order to break even?
-  18 Katherine D'Ann, from Problem 17, has become concerned that sales may fall, as the team is on a

terrible losing streak, and attendance has fallen off. In fact, Katherine believes that she will sell only 500 programs for the next game. If it was possible to raise the selling price of the program and still sell 500, what would the price have to be for Katherine to break even by selling 500?

-  19 Farris Billiard Supply sells all types of billiard equipment, and is considering manufacturing their own brand of pool cues. Mysti Farris, the production manager, is currently investigating the production of a standard house pool cue that should be very popular. Upon analyzing the costs, Mysti determines that the materials and labor cost for each cue is \$25, and the fixed cost that must be covered is \$2,400 per week. With a selling price of \$40 each, how many pool cues must be sold to break even? What would the total revenue be at this break-even point?

-  20 Mysti Farris (see Problem 19) is considering raising the selling price of each cue to \$50 instead of \$40. If this is done while the costs remain the same, what would the new break-even point be? What would the total revenue be at this break-even point?

- : 21 Mysti Farris (see Problem 19) believes that there is a high probability that 120 pool cues can be sold if the selling price is appropriately set. What selling price would cause the break-even point to be 120?

-  22 Golden Age Retirement Planners specializes in providing financial advice for people planning for a comfortable retirement. The company offers seminars on the important topic of retirement planning. For a typical seminar, the room rental at a hotel is \$1,000, and the cost of advertising and other incidentals is about \$10,000 per seminar. The cost of the materials and special gifts for each attendee is \$60 per person attending the seminar. The company charges \$250 per person to attend the seminar as this seems to be competitive with other companies in the same business. How many people must attend each seminar for Golden Age to break even?

-  23 A couple of entrepreneurial business students at State University decided to put their education into practice by developing a tutoring company for business students. While private tutoring was offered, it was determined that group tutoring before tests in the large statistics classes would be most beneficial. The students rented a room close to campus for \$300 for 3 hours. They developed handouts based on past tests, and these handouts (including color graphs) cost \$5 each. The tutor was paid \$25 per hour, for a total of \$75 for each tutoring session.

- (a) If students are charged \$20 to attend the session, how many students must enroll for the company to break even?
- (b) A somewhat smaller room is available for \$200 for 3 hours. The company is considering this possibility. How would this affect the break-even point?

Note:  means the problem may be solved with QM for Windows;  means the problem may be solved with Excel QM; and  means the problem may be solved with QM for Windows and/or Excel QM.