

MAT540

Week 1 Homework

Chapter 1

1. The Retread Tire Company recaps tires. The fixed annual cost of the recapping operation is \$65,000. The variable cost of recapping a tire is \$7.5. The company charges \$25 to recap a tire.
 - a. For an annual volume of 15,000 tires, determine the total cost, total revenue, and profit.
 - b. Determine the annual break-even volume for the Retread Tire Company operation.
2. Evergreen Fertilizer Company produces fertilizer. The company's fixed monthly cost is \$25,000, and its variable cost per pound of fertilizer is \$0.20. Evergreen sells the fertilizer for \$0.45 per pound. Determine the monthly break-even volume for the company.
3. If Evergreen Fertilizer Company in problem 2 changes the price of its fertilizer from \$0.45 per pound to \$0.55 per pound, what effect will the change have on the break-even volume?
4. If Evergreen Fertilizer Company increases its advertising expenditure by \$10,000 per year, what effect will the increase have on the break-even volume computed in problem 2?
5. Annie McCoy, a student at Tech, plans to open a hot dog stand inside Tech's football stadium during home games. There are 6 home games scheduled for the upcoming season. She must pay the Tech athletic department a vendor's fee of \$3,000 for the season. Her stand and other equipment will cost her \$3,500 for the season. She estimates that each hot dog she sells will cost her \$0.40. She has talked to friends at other universities who sell hot dogs at games. Based on their information and the athletic department's forecast that each game will sell out, she anticipates that she will sell approximately 1,500 hot dogs during each game.
 - a. What price should she charge for a hot dog in order to break even?
 - b. What factors might occur during the season that would alter the volume sold and thus the break-even price Annie might charge?
6. The college of business at Kerouac University is planning to begin an online MBA program. The initial start-up cost for computing equipment, facilities, course development and staff recruitment and development is \$400,000. The college plans to charge tuition of \$20,000 per student per year. However, the university administration will charge the college \$10,000 per student for the first 100 students enrolled each year for administrative costs and its share of the tuition payments.
 - a. How many students does the college need to enroll in the first year to break-even?
 - b. If the college can enroll 80 students the first year, how much profit will it make?

- c. The college believes it can increase tuition to \$25,000, but doing so would reduce enrollment to 50. Should the college consider doing this?

Chapter 11

7. The following probabilities for grades in management science have been determined based on past records:

Grade	Probability
A	0.1
B	0.2
C	0.4
D	0.2
F	0.10
	1.00

The grades are assigned on a 4.0 scale, where an A is a 4.0, a B a 3.0, and so on. Determine the expected grade and variance for the course.

8. An investment firm is considering two alternative investments, A and B, under two possible future sets of economic conditions good and poor. There is a .60 probability of good economic conditions occurring and a .40 probability of poor economic conditions occurring. The expected gains and losses under each economic type of conditions are shown in the following table:

Investment	Economic Conditions	
	Good	Poor
A	\$380,000	-\$100,000
B	\$130,000	\$85,000

Using the expected value of each investment alternative, determine which should be selected.

9. The weight of the bags of fertilizer is normally distributed, with a mean of 45 pounds and a standard deviation of 5 pounds. What is the probability that a bag of fertilizer will weigh between 38 and 50 pounds?

10. The polo Development Firm is building a shopping center. It has informed renters that their rental spaces will be ready for occupancy in 18 months. If the expected time until the shopping center is completed is estimated to be 15 months, with a standard deviation of 5 months, what is the probability that the renters will not be able to occupy in 18 months?
11. The manager of the local National Video Store sells videocassette recorders at discount prices. If the store does not have a video recorder in stock when a customer wants to buy one, it will lose the sale because the customer will purchase a recorder from one of the many local competitors. The problem is that the cost of renting warehouse space to keep enough recorders in inventory to meet all demand is excessively high. The manager has determined that if 85% of customer demand for recorders can be met, then the combined cost of lost sales and inventory will be minimized. The manager has estimated that monthly demand for recorders is normally distributed, with a mean of 175 recorders and a standard deviation of 55. Determine the number of recorders the manager should order each month to meet 85% of customer demand.