

Problems

3-17 Kenneth Brown is the principal owner of Brown Oil, Inc. After quitting his university teaching job, Ken has been able to increase his annual salary by a factor of over 100. At the present time, Ken is forced to consider purchasing some more equipment for Brown Oil because of competition. His alternatives are shown in the following table:

EQUIPMENT	FAVORABLE MARKET (\$)	UNFAVORABLE MARKET (\$)
Sub 100	300,000	-200,000
Oiler J	250,000	-100,000
Texan	75,000	-18,000

For example, if Ken purchases a Sub 100 and if there is a favorable market, he will realize a profit of \$300,000. On the other hand, if the market is unfavorable, Ken will suffer a loss of \$200,000. But Ken has always been a very optimistic decision maker.

- (a) What type of decision is Ken facing?
- (b) What decision criterion should he use?
- (c) What alternative is best?

3-19 The *Lubricant* is an expensive oil newsletter to which many oil giants subscribe, including Ken Brown (see Problem 3-17 for details). In the last issue, the letter described how the demand for oil products would be extremely high. Apparently, the American consumer will continue to use oil products even if the price of these products doubles. Indeed, one of the articles in the *Lubricant* states that the chances of a favorable market for oil products was 70%, while the chance of an unfavorable market was only 30%. Ken would like to use these probabilities in determining the best decision.

- (a) What decision model should be used?
- (b) What is the optimal decision?
- (c) Ken believes that the \$300,000 figure for the Sub 100 with a favorable market is too high. How much lower would this figure have to be for Ken to change his decision made in part (b)?

3-24 Today's Electronics specializes in manufacturing modern electronic components. It also builds the equipment that produces the components. Phyllis Weinberger, who is responsible for advising the president of Today's Electronics on electronic manufacturing equipment, has developed the following table concerning a proposed facility:

	PROFIT (\$)		
	STRONG MARKET	FAIR MARKET	POOR MARKET
Large facility	550,000	110,000	-310,000
Medium-sized facility	300,000	129,000	-100,000
Small facility	200,000	100,000	-32,000
No facility	0	0	0

- (a) Develop an opportunity loss table.
- (b) What is the minimax regret decision?

3-26 Megley Cheese Company is a small manufacturer of several different cheese products. One of the products is a cheese spread that is sold to retail outlets. Jason Megley must decide how many cases of cheese spread to manufacture each month. The probability that the demand will be six cases is 0.1, for 7 cases is 0.3, for 8 cases is 0.5, and for 9 cases is 0.1. The cost of every case is \$45, and the price that Jason gets for each case is \$95. Unfortunately, any cases not sold by the end of the month are of no value, due to spoilage. How many cases of cheese should Jason manufacture each month?

3-36 Jerry Smith is thinking about opening a bicycle shop in his hometown. Jerry loves to take his own bike on 50-mile trips with his friends, but he believes that any small business should be started only if there is a good chance of making a profit. Jerry can open a small shop, a large shop, or no shop at all. The profits will depend on the size of the shop and whether the market is favorable or unfavorable for his products. Because there will be a 5-year lease on the building that Jerry is thinking about using, he wants to make sure that he makes the correct decision. Jerry is also thinking about hiring his old marketing professor to conduct a marketing research study. If the study is conducted, the study could be favorable (i.e., predicting a favorable market) or unfavorable (i.e., predicting an unfavorable market). Develop a decision tree for Jerry.

3-47 In this chapter a decision tree was developed for John Thompson (see Figure 3.5 for the complete decision tree analysis). After completing the analysis, John was not completely sure that he is indifferent to risk. After going through a number of standard gambles, John was able to assess his utility for money. Here are some of the utility assessments: $U(-\$190,000) = 0$, $U(-\$180,000) = 0.05$, $U(-\$30,000) = 0.10$, $U(-\$20,000) = 0.15$, $U(-\$10,000) = 0.2$, $U(\$0) = 0.3$, $U(\$90,000) = 0.5$, $U(\$100,000) = 0.6$, $U(\$190,000) = 0.95$, and $U(\$200,000) = 1.0$. If John maximizes his expected utility, does his decision change?