MGT 2250 Management Statistics

Sample Final Part 2

1. A construction firm bids on a contract. It anticipates a profit of $50,000 if it gets the contract for the full project, and it estimates its profit to be $20,000 on a shared project. The firm estimates there's a 20% chance it will get the full contract and a 75% chance it will get the shared contract; otherwise, it gets nothing.

- (a) Define a random variable to model the outcome of the bid for this firm.
- (b) What is the expected profit earned on these contracts? Report units with your answer.
- (c) What is the standard deviation of the profits?

2. Customers at a fast-food restaurant buy both sandwiches and drinks. The following joint distribution summarizes the numbers of sandwiches (*X*) and drinks (*Y*) purchased by customers.

		X	
		1 sandwich	**2 sandwiches**
Y	**1 drink**	0.40	0.20
	2 drinks	0.10	0.25
	3 drinks	0	0.05

- (a) Find the expected value and variance of the number of sandwiches.
- (b) Find the expected value and variance of the number of drinks.
- (c) Find the correlation between *X* and *Y*.

3. An accounting firm assists small businesses file annual tax forms. It assigns each new client to a CPA at the firm who specializes in companies of that type and size. For instance, one CPA specializes in boutique clothing retailers with annual sales of about $2 million. To speed the process, each business submits a preliminary tax form to the accounting firm.

- (a) Would a normal model be useful to describe the total size of adjustments when a CPA reviews the preliminary tax forms? (For example, suppose the preliminary form claims that the business

owes taxes of $40,000. If form completed by the CPA says the tax obligation is $35,000 then the adjustment is −$5,000.)

- (b) What data would help you decide if a normal model is appropriate? (You cannot use data from the current year; those data are not yet available.)
- (c) If the average adjustment obtained by the CPA who specializes in clothing retailers is −$7,000 (i.e., $7,000 less than indicated on the preliminary form), then what SD implies that all but a few business end up with lower taxes after the work of these accountants? (Assume a normal model for this question.)
- (d) Would a normal model be useful to describe the total size of adjustments for all of the CPAs at this accounting firm?

4. A hurricane bond pays the holder a face amount, say $1 million, if a hurricane causes major damage in the United States. Suppose that the chance for such a storm is 5% per year.

- (a) If a financial firm sells these bonds for $60,000, what is the chance that the firm loses money if it only sells one of these?
- (b) If the firm sells 1,000 of these policies, each for $60,000, what is the probability that it loses money?
- (c) How does the difference between the probabilities of parts (a) and (b) compare to the situation of a life insurance company that writes coverage to numerous patients that live or die independently of one another?