ECONOMICS 261
STATISTICAL METHODS
PROF. KARSTENSSON

EXAM 2
SPRING SEMESTER 2002

Instructions: Write (1) your name, (2) the class and section number, and (3) the date on the front cover of your Examination Book. Answer all the questions in Parts I, II, and III of this Exam in your Examination Book. Clearly note the question number (and letter if appropriate) at the beginning of your work and/or answer to each question. Turn in your Exam and Exam Book when you are finished with the test.

GOOD LUCK!

Part I: Concept questions: Write the correct term (word or words) for each of the following: (4 points each)

1. The approach to probability that is based on observation of experience.
2. An action which results in outcomes.
3. A variable that can take on an infinite number of values over a given interval.
4. Distribution that illustrates the arrival times of people at a concert.
5. Z.

Part II: Problem questions: Solve the following problems. Show your work in your Exam Book and designate your final answer in each case by drawing a box around it. (15 points each)

6. The following contingency table shows the numbers of students affected and not affected by the 9/11 tragedy by major (Business, Hotel, and Other) in a sample of 116 UNLV students taking Economics 261 in the Spring Semester of 2002.

Major	Affected by the 9/11 Tragedy (A)	Not Affected by the 9/11 Tragedy (N)
Business (B)	44	29
Hotel (H)	31	5
Other (O)	5	2

(a) Write this contingency table as a probability matrix.
(b) What is the probability that a given student in this data set was affected by the 9/11 tragedy?
(c) What is the probability that a given student in this data set was not affected by the 9/11 tragedy?
(d) What is the probability that a given business student in this data set was affected by the 9/11 tragedy?
(e) What is the probability that a given hotel student in this data set was affected by the 9/11 tragedy?

7. Suppose the Bellagio has four high-end deluxe suites equipped with all amenities including a butler and maid. The following probability distribution provides the number of suites, X, and the probability that the given number of suites will be occupied on a given day, P(X).

X	P(X)
0	.10
1	.15
2	.20
3	.25
4	.30

(a) What is the expected number of suites occupied on a given day?
(b) What is the variance for the number of suites occupied on a given day?
(c) What is the standard deviation for the number of suites occupied on a given day?

8. Find the following:

(a) $P(X=4|n=5,\pi=.4)$?
(b) $P(X=4|n=10,\pi=.4)$?
(c) $P(X<4|n=12,\pi=.4)$?

9. Suppose the daily gross income of the Bellagio is normally distributed with μ = \$6 million and σ = \$1.2 million.

(a) What is the probability that the Bellagio's gross income on a randomly selected day will be between \$6 million and \$7 million?
(b) On what percent of the days will the Bellagio's gross income be between \$4 million and \$5 million?
(c) How many days in a 365-day year will the Bellagio's gross income be greater than \$8 million?

Part III: Interpretation questions. Explain as fully as you can. (10 points each)

10. What is the meaning of your answer to question 7(c)?

11. What type of variable is examined in:

(a) question 7?
(b) question 9?

Part IV: Optional extra credit question. (2 points)

12. Who is Alicia Larde in the movie, *A Beautiful Mind*?

* THE END *

If there is time remaining, check your work for accuracy?

EXAM 2 FORMULAS

Note: $\sqrt{}$ = square root

1. $P(A) = \frac{n_A}{n}$

2. $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

3. $P(A \cap B) = P(A) \cdot P(B|A)$

4. $P(A|B) = \frac{P(A \cap B)}{P(B)}$

5. $E(X) = \Sigma XP(X)$

6. $\sigma^2(X) = \Sigma\{[X-E(X)]^2 P(X)\}$

7. $\sigma(X) = \sqrt{\sigma^2(X)}$

8. $P(X|n,\pi) = \frac{n!}{X!(n-X)!} \pi^X (1-\pi)^{n-X}$

9. $E(X) = n\pi$

10. $\sigma^2(X) = n\pi(1-\pi)$

11. $\sigma(X) = \sqrt{\sigma^2(X)}$

12. $Z = \frac{X - \mu}{\sigma}$ $\qquad$ $Z = \frac{X[\pm.5] - \mu}{\sigma}$

Also included in this test are the following:

Table of binomial probabilities for some pertinent values of n.

Table of standard normal probabilities.