251x0472 11/22/04

ECO251 QBA1
THIRD EXAM
Dec 1, 2004

Name: _____
Student Number: _____
Class Time (Circle) 10am 11am 1pm 2pm

Part I: 8 points.

Z follows the standardized Normal distribution $(z \sim N(0,1))$.

Find the following. **Make diagrams!** (0.5 extra credit for each useful diagrams)

1. $P(-2.12 \leq z \leq -1.67)$

2. $P(-1.67 \leq z \leq 1.45)$

3. $P(z \leq 1.45)$

4. $P(1.45 \leq z \leq 3.64)$

Part II: (22+ points) Do all the following: All questions are 2 points each except as marked. Exam is normed on 50 points including take-home. (**Showing your work can give partial credit on some problems! In open-ended questions it is expected. Please indicate clearly what sections of the problem you are answering and what formulas you are using. Neatness counts!**) Remember that you may not be able to finish this section, so ration your time on each problem. [Numbers in brackets are a cumulative total]

1. The covariance
   a) must be between -1 and +1.
   b) must be positive.
   c) can be positive or negative.
   d) must be between zero and +1

2. The portfolio expected return of two investments
   a) will be higher when the covariance is zero.
   b) will be higher when the covariance is negative.
   c) will be higher when the covariance is positive.
   d) does not depend on the covariance.

3. An average of 16 customers arrive at a checkout counter every minute and we want to find the probability that more than 22 will show in a given minute, the Poisson distribution will be used with a standard deviation of
   a) 2
   b) 4
   c) 16
   d) here is not enough information.

4. (Mansfield) From experience, the director of a computer center knows that any one of the twenty-five PCs in the room is broken 4% of the time. Whether or not any given PC is broken does not depend on how much it is used; they just seem to break down randomly. What type of probability distribution would be used to figure out the probability that more than eight of the PCs will be broken down at the same time?
   a) binomial distribution.
   b) Poisson distribution.
   c) hypergeometric distribution.
   d) none of the above.

5. You receive two tickets for a sold-out concert. You call four potential dates for the evening. You think that there is a chance of $\frac{1}{3}$ that each of the individuals would call back and agree to go to a concert with you. You will be very embarrassed if more than one accepts. What is the probability that exactly one out of the four says 'yes?' (Extra credit: Do this last! What is the probability that you are embarrassed?) **Show your work!** (3) [11]

Questions 6-10 are based on exhibit 1. **Show your work if you expect full credit!**

Exhibit 1: The table below shows average Fahrenheit temperature and yield in lbs./acre for an industrial crop.

F	Y
63	10
70	15
75	17
79	16
80	20

The following calculations are done for you. One more column is needed.

Row	x	x^2	y	y^2
1	63	3969	10	100
2	70	4900	15	225
3	75	5625	17	289
4	79	6241	16	256
5	80	6400	20	400
	367	27135	78	1270

6. Find the sample standard deviation of Fahrenheit temperatures, x (2)

7. Find the sample covariance between Fahrenheit temperature and yield.(3)

8. Find the sample correlation between Fahrenheit temperature and yield. (2) [18]

9. If the conversion formula for Celsius temperature is C = 5/9(F-32), find the covariance between Celsius temperature and yield. (Hint: You are finding the sample covariance between two random variables, one of which is $w = 5/9\,x - 160/9$ and the other of which is $v = 1y + 0$. (2)

10. If the conversion formula for Celsius temperature is C = 5/9(F-32), find the correlation between Celsius temperature and yield. (2) [22]