BUSINESS STATISTICS - Second Year
Voluntary Quiz 1

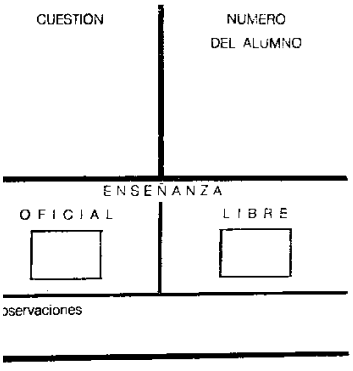
Academic Year 2010-11
November 19, 2011

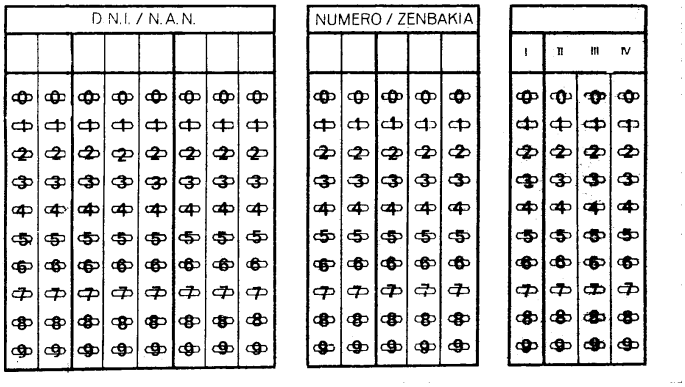
INSTRUCTIONS

1. The quiz contains multiple choice questions that must be answered in the orange code sheet we have provided you with.
2. To select an answer, all you need to do is mark in the orange code sheet, **filling the rectangle over which the selected answer is located appropriately**. Please make sure you know the answer you wish to mark before doing it. Even though you can always erase your mark if you have used a pencil (number 2 or similar), any mark that has not been completely erased could be read by the machine. Therefore, we advice you to first mark your selected answers in the exam and to use only the last ten minutes or so from the time assigned to the multiple choice questions part of the exam to copy them into the code sheet.
3. In the multiple choice questions part of the exam there is always **only one correct answer** for every question. Every question correctly answered is worth 1 point, while each question incorrectly answered will not penalize your grade at all. Questions that have not been answered do not penalize your grade in any form.
4. The quiz has three numbered sheets, going from 0.1 to 0.3. Please make sure that you have all sheets and contact your professor if this is not the case. There are different exam types. This exam is of type 0. Mark a 0 in the column labelled with I in your code sheet, just as it is illustrated in the example.
5. The maximum final grade is 15 points. **You will need to obtain 11 points to pass this quiz**.
7. Please fill in your personal information in the appropriate places in the code sheet.

Example:

12545 PEREZ, Ernesto Exam type 0 Resit





MULTIPLE CHOICE QUESTIONS (Time: 45 minutes)

1. The capital of Spain is:

   (A) Paris (B) Sebastopol (C) Madrid (D) Londres (E) Pekin

Questions 2 and 3 refer to the following exercise:

The probability that a shoe store is profitable is 0.8. We select 10 shoe stores independently.

2. The probability that 4 of them are profitable is:

   (A) 0.0055 (B) 0.0881 (C) 0.9909 (D) 0.9991 (E) 0.9672

3. The probability that at least 5 of them are profitable is:

   (A) 0.0064 (B) 0.0264 (C) 0.9672 (D) 0.9936 (E) 0.0328

Questions 4 to 6 refer to the following exercise:

The number of cars that go to a given gas station in a half an hour period follows a Poisson distribution with mean 6. We assume independence between the different time periods.

4. We can state that:

   (A) $P(7) = P(6)$ (B) - (C) - (D) $P(7) < P(6)$ (E) $P(7) > P(6)$

5. The probability that in a one-hour period 4 cars go to that specific gas station is:

   (A) 0.0086 (B) 0.0027 (C) 0.0053 (D) 0.0003 (E) 0.0013

6. The approximate probability that in a two-hour period fewer than 30 cars go to that specific gas station is:

   (A) 0.9066 (B) 0.8686 (C) 0.8888 (D) 0.8212 (E) 0.8461

Questions 7 to 9 refer to the following exercise:

The probability that a client returns a given item in a shopping center is 0.05.

7. If we ask 10 randomly selected clients, the probability that only one of them returns a given item is:

   (A) 0.0315 (B) 0.1722 (C) 0.3151 (D) 0.4053 (E) 0.6247

8. If we ask 60 randomly selected clients, the approximate probability that at least 4 of them return a given item is:

   (A) 0.3528 (B) 0.1847 (C) 0.7257 (D) 0.6179 (E) 0.2241

9. If we ask 500 randomly selected clients, the approximate probability that more than 20 of them return a given item is:

   (A) 0.2358 (B) 0.8159 (C) 0.1788 (D) 0.8212 (E) 0.7642

10. Let $\{X_n\}_{n\in N}$ be a sequence of r.v. defined as:

$$X_n = \begin{cases} 2 & \text{with probability } 1-\frac{1}{n} \\ 0 & \text{with probability } \frac{1}{n} \end{cases}$$

Then, we have that:

(A) $X_n \xrightarrow{\mathbf{p}} 2$ (B) $X_n \xrightarrow{\mathbf{p}} 0$ (C) All false

(D) $E(X_n) = 0$ (E) $E(X_n) = 2$

11. Let $\{X_n\}_{n\in N}$ be a sequence of r.v. such that:

$$P(X_n = 0) = 1 - \tfrac{1}{n^r}\ , \qquad P(X_n = 1) = \tfrac{1}{n^r}\ , \qquad r > 0$$

Then, we have that:

(A) $X_n \xrightarrow{\mathbf{q}} 1$ (B) - (C) $X_n \xrightarrow{\mathbf{q}} 0$

(D) - (E) All false

12. Let X_1 and X_2 be independent random variables with distributions $\gamma(0.5,\ 1)$ and $\gamma(1,\ 1)$, respectively. The distribution of the random variable $X_1 + 2X_2$ is:

(A) χ^2_4 (B) All false (C) exp(1.5) (D) $\gamma(1.5,\ 1)$ (E) χ^2_2

Questions 13 to 15 refer to the following exercise:

Let X_1, X_2 and X_3 be independent random variables following a normal distribution with means 5, 0 and 3, and variances 4, 1 and 9, respectively.

13. The distribution of the random variable $L = \left(\frac{X_1 - 5}{2}\right)^2 + X_2^2$ is:

(A) $F_{2,1}$ (B) $F_{1,2}$ (C) χ^2_2 (D) t_2 (E) All false

14. The distribution of the random variable $Y = \dfrac{L}{\left(\frac{X_3-3}{3}\right)^2}$ is:

(A) χ^2_2 (B) $F_{1,2}$ (C) All false (D) t_2 (E) $F_{2,1}$

15. The distribution of the random variable $Z = \dfrac{\left(\frac{X_3-3}{3}\right)}{\sqrt{L/2}}$ is:

(A) t_1 (B) t_2 (C) χ^2_2 (D) $F_{2,1}$ (E) All false