



Introduction to Statistics

Exercises 8-9

Problems 2d), 3, 4, 5 and 9c) can be solved using Excel

PROBLEM 1. On average, one in every twenty students in Political Science and Journalism says that they are a member of a political party.

- a) Talking to students in these degree programs, what is the chance that the first member of a political party is the tenth student we talk to?
- b) One class contains 30 students. What is the chance that exactly one of them is a party member?
- c) In a theory class of 60 students, how many party members do you expect to see?
- d) What assumptions are we making in the above? Are they reasonable?

PROBLEM 2. An Industrial Relations exam contains 10 questions each with 4 possible responses. A student who has not gone to class and knows nothing about the course chooses their answers at random.

- a) What is the chance that they get the first question right?
- b) What is the chance that they get every question wrong?
- c) What is the chance that they get at least one question right?
- d) What is the chance that the number of right answers is not three?

PROBLEM 3. A study by Wallis (1936) and [a recent update by Cole \(2010\)](#) have found that the number of US Supreme Court vacancies per year is very well modeled by a Poisson distribution with mean 0.5. Assuming that this model holds, what is the probability that there is at least one vacancy next year? What about the next ten years?

PROBLEM 4. The height of women in a certain country follows a normal distribution with mean 162.5 cm and standard deviation 2.5 cm and, independently, the height of men is normal with mean 170 cm and standard deviation 5 cm.

- a) What is the proportion of women under 168 cm tall?
- b) Calculate the proportion of women who are taller than the median male height.
- c) Calculate the third quartile of the female height distribution and the first quartile for the males.

PROBLEM 5. The average duration of a Journalism lecture class is 85 minutes with s.d. 4 minutes.

- a) What is the probability that a class lasts over 90 minutes?
- b) What is the probability it lasts exactly 90 minutes?
- c) If the lecturer gives 3 classes, what is the chance that they all last less than 90 minutes?

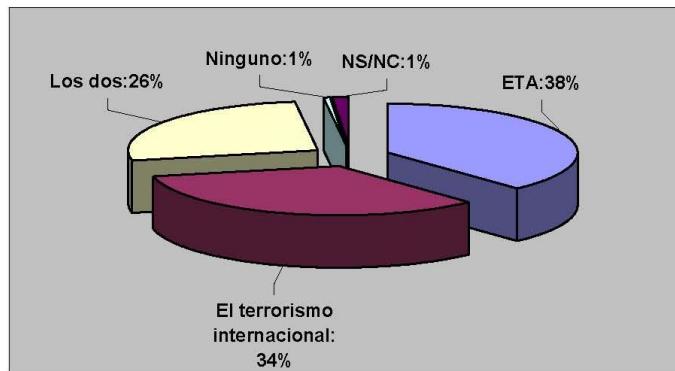
PROBLEM 6. The following pie chart comes from a recent opinion poll by the Real Instituto Elcano:

4. ETA y el terrorismo internacional

La distancias entre a quienes les preocupa más ETA y quienes les preocupa más el terrorismo internacional se acortan significativamente en esta edición, pasando a ser de sólo 4 puntos: un 38% considera a ETA una amenaza mayor que el terrorismo internacional, y un 34% lo contrario.

¿Cuál le parece que es una amenaza mayor para España?

- *ETA*
- *El terrorismo internacional*



If these responses are representative of opinions in Spain and two Spanish adults are chosen at random, what is the chance that they both think that only ETA is a big threat to Spain?

- a)** 0,3800
- b)** 0,1444
- c)** 0,0676
- d)** 0,7600

PROBLEM 7. Referring to the previous question, if we interview various people, the probability that the first of them who thinks that ETA is the most serious problem is the fourth person we talk to is (to 4 decimal places):

- a)** 0,3800
- b)** 0,0209
- c)** 0,0906
- d)** 0,6200

PROBLEM 8. In the last CIS barometer in Madrid, Tomás Gómez was evaluated at 4,2 on average with standard deviation 1,1. Assuming these evaluations are normally distributed, what is the probability that a randomly chosen Madrileño gives him an evaluation of at least 5?

PROBLEM 9. Referring to Question 5, in a simple of 1200 personas, the number who think that ETA is the most important problem is

- a)** 4560
- b)** 38
- c)** 456
- d)** None of the above

PROBLEM 10. In the CIS barometer of March 2014, Mariano Rajoy received a mean rating of 2,22 with standard deviation 2,41. Assuming the distribution of his ratings is normal:

- a) Calculate the probability that a person evaluates him with less than 2,22.
- b) What is the chance he is rated exactly 2,22?
- c) What is the chance that a person passes Mariano Rajoy (rates him over 5)?
- d) What is the chance that four independent people all rate Mariano Rajoy over 2,22?