

Math. A4, Midterm Test 1, SAMPLE

1. There are 10 boys and 9 girls in a company. They organize a party (only for themselves). Each of the boys goes to the party with probability 0.7, and each of the girls goes to the party with probability 0.8, independently of each other.
 - (a) Find the probability that at least 6 of the girls will go to the party.
 - (b) Find the probability that there will be at least 10 people in the party and the number of boys and girls will be the same.
2. In a city, I have to ask 2.5 people on average, so that to find someone who speaks English. Find the probability that
 - (a) randomly selecting someone, he/she will speak English.
 - (b) I have to ask more than 3 people to find an English-speaker.
3. In a country, 75% of the adult population do some sport. Write the exact probability (with formula) that out of 500 randomly selected adults the number of those who do some sport is more than 400. (Justify for the choice of the distribution.)
4. Referring to the previous exercise, approximate the probability that out of 500 randomly selected adults the number of those who do some sport is more than 400. (Justify for the approximation, and use the Table of the Φ function.)
5. The lifetime of a certain electric bulb follows exponential distribution. About 25% of them survives the 1 year period.
 - (a) What is the average lifetime (in years) of such a bulb?
 - (b) About what proportion of the bulbs will survive the 1.5 year period?
6. Let A and B be two independent events, $\mathbb{P}(A) = 0.6$, $\mathbb{P}(B) = 0.7$. $\mathbb{P}(\bar{A} + \bar{B}) = ?$
7. The probability density function of a continuous random variable X is $f(x) = 2x/25$ ($0 < x < 5$), and 0 otherwise.
 - (a) Find the probability that $X < 3$.
 - (b) Find the expected value of X .

Standard normal c.d.f. (next page)

