**Probability**

1. The probability of correctly guessing a question in a multiple-choice exam with three alternatives is 1/3 (0.3333 ...). Let's assume that we have an exam that consists of 5 questions (on very different topics) and we answer all the questions randomly.  
-What is the probability of correctly guessed the 5 questions?  
-What is the probability of being wrong in the 5 questions?  
- What is the probability of correctly guessing at least one question?  
- What is the probability of being wrong in at least one question?  
  
**Random Variables**

2. We throw a three-sided dice twice ("1", "2", "3"); let’s assume that all sides are equally likely. Let X be the random variable "sum of scores on both attempts".  
- Is this a continuous or a discrete random variable?  
-Indicate the probability function of X  
-Indicate the distribution function of X  
  
3. We have a continuous random variable defined by the function f (x) = 0.2 from x = 0 to b.  
-What is the value of b?  
-What is the value of f (1)? What does it mean?  
-What is the value of F (1)? What does it mean?  
-What is the value of F (X = 1)? What does it mean?  
-What is the value of P (X <= 2)? Can you express it in another way?  
  
4. We have a continuous random variable defined by the function f (x) = c from a = 1 to 7.  
-What is the value of c?  
-What is the value of f (3)?  
-What is the value of F (3)?  
-What is the value of F (10)?  
  
4. There is a game in which we have to pay € 10 each time. We throw a dice (of six sides). If a 6 comes out, you get 25€, and if a 5 comes out, you get 20 €. Is it worth participating in the long run?  
  
**Theoretical probability distributions (normal distribution)**  
5. My neighbor Lourdes claims that she has an IQ of 135. (Assume that IQ has an average of 100 and a standard deviation of 15.) What percentage of people will have an IQ below Lourdes?  
6. Luis, Lourdes’ husband, affirms that his IQ is such that 97.5% of people have a lower IQ than his. What is his IQ?

7. What percentage of people have an IQ that ranges between Lourdes’ IQ and Luis’ IQ?

8. What percentage of people has an IQ between 100 and 120?  
9. We want to create a "MENSA"-like association, so that we only want as members the smartest 5% of the population. What cutoff point will we establish?