

Introduction to Probability, Statistics and Data Handling	<b>Gaussian and Binomial distributions</b>
Tutorial 5b	

1. A student takes a ten-question true/false exam.
  - a) Find the probability that the student gets exactly six of the questions right simply by guessing the answer on every question.
  - b) Find the probability that the student will obtain a passing grade of 60% or greater simply by guessing.
  
2. If every newborn baby has an equal chance of being a boy or a girl, find the probability that among 1000 newborns there is a maximum of 490 girls. Calculate it also for 10 babies and 4 girls.
  
3. The lifetimes of the tread of a certain automobile tire are normally distributed with mean 37,500 km and standard deviation 4,500 km. Find the probability that the tread life of a randomly selected tire will be between 30,000 and 40,000 km.
  
4. Scores on a standardized college entrance examination (*CEE*) are normally distributed with mean 510 and standard deviation 60. A selective university considers for admission only applicants with *CEE* scores over 650. Find percentage of all individuals who took the *CEE* who meet the university's *CEE* requirement for consideration for admission.
  
5. Find  $z_{0.1}$  and  $-z_{0.1}$ , the values of  $Z$  that cut off right and left tails of area 0.01 in the standard normal distribution.
  
6. Find  $x^*$  such that  $P(X < x^*)=0.9332$ , where  $X$  is a normal random variable with mean 10 and standard deviation 2.5.
  
7. All boys at a military school must run a fixed course as fast as they can as part of a physical examination. Finishing times are normally distributed with mean 29 minutes and standard deviation 2 minutes. The middle 75% of all finishing times are classified as "average." Find the range of times that are average finishing times by this definition.
  
8. The final exam scores in a statistics class were normally distributed with a mean of 63 and a standard deviation of five.
  - a) Find the probability that a randomly selected student scored more than 65 on the exam.
  - b) Find the probability that a randomly selected student scored less than 8.)
  - c) Find the 90<sup>th</sup> percentile (that is, find the score  $k$  that has 90% of the scores below  $k$  and 10% of the scores above  $k$ ).
  - d) Find the 70<sup>th</sup> percentile (that is, find the score  $k$  such that 70% of scores are below  $k$  and 30% of the scores are above  $k$ ).