Introduction to Probability, Statistics and Data Handling	**Gaussian and Binomial distributions**
Tutorial 6 (e-learning)	with answers

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. *(Answer: 0.205)*
    b. Find the probability that the student will obtain a passing grade of 60% or greater simply by guessing. *(Answer: 0.377)*
2. 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.

    Hint: you can do this using binomial, but it gets hard to calculate on calculator therefore, you can apply normal distribution: P (X≤(X-μ)/σ) = P (X≤(490-500/15.811) (Ans: 0.2643)
3. 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. *(Answer: 1%)*
4. Find $z_{0.1}$ and $-z_{0.1}01$, the values of *Z* that cut off right and left tails of area 0.01 in the standard normal distribution. *(Answer:* $z_{0.1} \approx -2.33$)
5. Find x^* such that $P(X < x^*)$=0.9332, where X is a normal random variable with mean μ=10 and standard deviation σ=2.5. *(Answer: 13.75)*
6. 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. *(Answer: (26.7;31.3) min.)*
7. 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. *(Answer: 0.31)*
    b) Find the probability that a randomly selected student scored less than 85. (*Answer:* $< 10^{-5}$)
    c) Find the 90th percentile (that is, find the score *k* that has 90% of the scores below *k* and 10% of the scores above *k*). *(Answer: 69.45)*
    d) Find the 70th percentile (that is, find the score *k* such that 70% of scores are below *k* and 30% of the scores are above *k*). *(Answer: 65.65)*