

Exam #2 Objectives

For Exam #2, a well-prepared student should be able to

- distinguish between a population and a sample
- distinguish between a parameter and a statistic
- identify the relevant variable(s), population(s), parameter(s), sample(s), and statistic(s) for a given scenario
- distinguish between an observational study and an experimental study
- describe the structure of an experimental study (subjects, factors, levels, treatments)
- recognize and apply basic statistical design principles of experiments: control, randomization, repetition
- implement randomization in experiment design
- understand the use of “significant” in the context of statistics
- understand uses and limitations of sampling to form conclusions about a population
- select and implement an appropriate sample procedure (simple random sample, stratified random sample, multistage sample) for a population
- understand potential sources of sample survey bias (voluntary response, undercoverage, nonresponse, poorly worded questions)
- understand how the sampling distribution of a statistic is constructed for a given sample size
- understand how variability in a sample distribution is related to sample size
- recognize a random process/phenomenon
- describe what probability means for a random process
- determine an appropriate probability model (sample space and probabilities) for a random process
- describe an event and its complement
- determine whether or not two events are disjoint
- determine whether or not two events are independent
- state and use the basic rules of probability
- distinguish between a discrete random variable and a continuous random variable
- construct and/or use a probability histogram for a discrete random variable or a probability density curve for a continuous random variable
- estimate the mean of a random variable from a probability histogram or a density curve
- compute and use the mean, variance, and standard deviation of a discrete random variable
- understand and apply the law of large numbers
- determine if two random variables are independent
- state and use the rules for the mean, variance, and standard deviation for a sum of two random variables
- state and use the rules for the mean and standard deviation for a linear transformation of a random variable