MATH-57091 Probability and Statistics for High-School Teachers.
Home Work 7, due on Wednesday, October 17,
Instructor: Prof. Artem Zvavitch
Each Problem is 11 points.

Problem 1. *Consider a sample from a population having mean* 128 *and standard deviation* 16*. Compute the approximate probability that the sample mean will lie between* 124 *and* 132 *when the sample size is*

- $n = 9$
- $n = 25$
- $n = 100$.

Problem 2. *The time it takes to develop a photographic print is a random variable with mean* 17 *seconds and standard deviation* 0.8 *seconds. Approximate the probability that the total amount of time that it takes to process* 100 *prints is*

- *More than* 1720 *seconds.*
- *Between* 1690 *and* 1710 *seconds.*

Problem 3. *A six-sided die, in which each side is equally likely to appear, is repeatedly rolled until the total of all rolls exceeds 400 (i.e. the sum of outcomes of the rolls is greater then* 400*). What is the approximate probability that this will require more than 140 rolls?*

Problem 4. *Suppose that the number of miles that an electric car battery functions has mean* μ *and standard deviation* 100*. using the central limit theorem approximate the probability that the average number of miles per battery obtained from a set of* n *batteries will differ from* μ *by more than* 20 *is*

- $n = 10$
- $n = 40$
- $n = 100$.

Problem 5. *Consider a sample of size* 16 *from a population having mean* 100 *and standard deviation* σ*. Approximate the probability that the sample mean lies between* 96 *and* 104 *when*

- $\sigma = 16$.
- $\sigma = 8$.
- $\sigma = 4$.
- $\sigma = 2$.
- $\sigma = 1$.