

MATH-57091 Probability and Statistics for High-School Teachers.
Home Work 8, due on Wednesday October 26,
EACH PROBLEM 13 points, SO YOU HAVE 15 points extra.
Instructor: Prof. Artem Zvavitch

Problem 1. Consider the following data:

| | Sleep 6 or less hours per night | Smoker | Never eat breakfast | Are 30% or more overweight |
|--------|---------------------------------|--------|---------------------|----------------------------|
| Male | 22.7 % | 32.6% | 25.2% | 12.1% |
| Female | 21.4 % | 27.8% | 23.6 % | 13.7% |

- Suppose a random sample of 300 males is chosen, approximate the probability that
 - (1) At least 75 never eat breakfast.
 - (2) Fewer than 100 smoke.
- Suppose that a random sample of 300 females is chosen, approximate the probability that
 - (1) At least 25 are overweight by 30 percent or more.
 - (2) Fewer than 50 sleep 6 hours or less nightly.

Problem 2. The following data represents the number of minutes each of a random sample of 15 recent patients at a medical clinic spent waiting to see a physician

46, 48, 22, 55, 45, 23, 54, 60, 36, 44, 50, 35, 66, 48, 30.

Use these data to estimate the average waiting time of all patients at this clinic. Also, please, provide the estimation for standard deviation.

Problem 3. A propose study for estimating the average cholesterol level of working adults calls for a sample size of 1000. If we want to reduce the resulting standard error by a factor of 4, what sample size is necessary?

Problem 4. A random sample of 1200 engineers included 28 Hispanic Americans, 45 African Americans, and 104 females. Estimate the proportion of all engineers who are

- Hispanic American.
- African American.
- Female.
- Also, please, estimate the standard error of the above estimates.

Problem 5. The city of Chicago had 12048 full-time law enforcement officers in 1990. To determine the number of African-Americans in this group, a random sample of 600 officers was chosen and it was discovered that 87 were African Americans.

- Estimate the the number of African Americans law enforcement officers who were employed full time in Chicago in 1990.
- Estimate the standard error of the above estimate.