

Lecture 2: Practice Problems

1. Suppose that you are interested in monitoring air pollution in Los Angeles, California, over a one-week period. Let X be a random variable that represents the number of days out of the seven on which the concentration of carbon monoxide surpasses a specified level. Do you believe that X has a binomial distribution? Explain.
2. Suppose 20% of grade-school students nationwide develop influenza. Further supposed that we are interested in a specific class of size 15. Lastly, assume that for the purposes of this example, influenza is not contagious.
 - a. What is our random variable, X , here? What distribution does it follow?
 - b. What is the probability that exactly 4 get influenza?
 - c. What is the probability that no more than 4 get influenza?
 - d. What is the probability that less than 4 get influenza?
 - e. What is the probability that at least 4 get influenza?
 - f. How many students should the teacher expect to be sick with influenza this year? What variability is associated with that estimate?
3. The distribution of weights for the population of males in the United States is approximately normal with mean 172.2 lbs and standard deviation 29.8 lbs. (*You will need to use the normal distribution tables posted under Files and Resources*).
 - a. What is the probability a randomly selected man weighs less than 150 lbs?
 - b. What is the probability a randomly selected man weighs more than 200 lbs?
 - c. What is the probability a randomly selected man weighs between 140 and 190 lbs?
 - d. What is the probability a randomly selected man weighs less than 150 lbs or more than 190 lbs?
4. Suppose that 25% of fire alarms in a large city are false alarms. Let X denote the number of false alarms in a random sample of 100 alarms. Use the normal approximation to the binomial with continuity correction to compute the following. (*You will need to use the normal distribution tables posted under Files and Resources*).
 - a. $*P(X=30)$
 - b. $P(X>30)$
 - c. $P(20 \leq X \leq 30)$
 - d. Is the normal approximation appropriate here?