Homework

4.26

For part b), replace  with 

Also answer: d) Are events A and B independent? Why or why not?

4.40 – Note that the book uses lowercase “y” rather than uppercase “Y” to represent random variables. Please make the corresponding changes here and elsewhere.

4.45

Also make a plot of the binomial distribution and mark the mean and the rule of thumb  on the plot. See if most of the probable values of y are contained within the interval.

4.48

4.69 Replace a mean of 36 days with 39 days. Replace a standard deviation of 3 days with 6 days

For part a), replace 30 days with 50 days.

Also make a plot of the normal distribution and mark the answers for a) and b) on the plot. See if your answers agree with what the plot suggests.

4.70

Replace the mean of 513 with a mean of 500, and replace the standard deviation of 130 with a standard deviation of 100.

4.72

Continue using the replacements from 4.70. Also, use top 10% rather than the top 5%.

Also make a plot of the normal distribution and mark the answers on the plot.

4.76

For a), use R to generate random samples.

4.77

4.83

Additional problems:

1. A group of physicians have collected information from new mothers to study the relationship between birth defects and underweight problems for newborns. A total of 352 new mothers were surveyed and the data are summarized in the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Birth Defects | |  |
|  |  | Yes | No | Total |
| Underweight | Yes | 12 | 51 | 63 |
| No | 41 | 248 | 289 |
|  | Total | 53 | 299 | 352 |

Let A denote the event that a newborn is underweight, and let B denote the event that a newborn has birth defects.

1. Compute P(A), P(B), P(A∩B) and P(A∪B). Interpret what these probabilities mean.
2. Find P(A|B), P(A|). Do you think A and B are independent? Do you think there is a relationship between birth defects and underweight problems for newborns?
3. A soft-drink machine is being regulated so that the amount of drink dispensed averages 240 milliliters with a standard deviation of 15 milliliters. Periodically, the machine is checked by taking a sample of 40 drinks and computing the average content.
   1. Suppose the machine is dispensing the amount of drink correctly. Find the approximate probability that the sample mean from 40 drinks is within 4.75 of the desired average.
   2. An observed sample mean was 230. Based upon this observed value and your probability calculation in a), is the machine dispensing the drink correctly? Explain your answer.

3) Review example 4.3