Computer Lab 9

Statistics for Computer Science – 201-H02-HR

Due: Tuesday, November 14th by noon

1. Pregnancy
   1. Assume that the duration of human pregnancies can be described by a Normal model with mean 266 days and standard deviation 16 days.
      1. What percentage of pregnancies should last between 270 and 280 days?

21.1%

* + 1. At least how many days should the longest 25% of all pregnancies last?

276.8 days or more

* + 1. Suppose a certain obstetrician is currently providing prenatal care to 60 pregnant women. Let ¯y represent the mean length of their pregnancies. According to the Central Limit Theorem, what is the distribution of this sample mean, y¯? Specify the model, mean, and standard deviation.

N(266, 2.07)

* + 1. What is the probability that the mean duration of these patients’ pregnancies will be less that 260 days?

.0002

* 1. The duration of human pregnancies may not actually follow a Normal model, as described above.
     1. Explain why it may be somewhat skewed to the left.

Because a pregnancy is more likely to be premature than exceed the expectation date. Doctors also stop pregnancies about 2 weeks past normal due dates.

* + 1. If the correct model is in fact skewed, does that change your answers to part (i), (ii), and (iii) above? Explain why or why not for each.
       1. Yes, since the normal model can’t be used if it’s too skewed.
       2. Again, the normal model can’t be used it it’s too skewed.
       3. Central Limit Theorem guarantees a normal model for this sample

1. Pregnancy (AGAIN!)
   1. In 1998, a San Diego reproductive clinic reported 49 live births to 207 women under the age of 40 who had previously been unable to conceive.
      1. Find a 90% confidence interval for the success rate at this clinic.

(18.8, 28.5)

* + 1. Interpret your interval in this context.

We are 90% confident that 18.8 to 28.5% of women under 40 who go to this click will get give birth.

* + 1. Explain what ”90% confidence” means.

About 90% of the samples in the total data set will be true cases.

* + 1. Do these data refute the clinic’s claim of a 25% success rate? Explain.

No, 25% is the interval, not the success rate itself.

* 1. The San Diego reproductive clinic wants to publish updated information on its success rate.
     1. The clinic wants to cut the stated margin of error in half. How many patients’ results must be used?

828

* + 1. Do you have any concerns about this sample? Explain.

828 women would exceed the 10% rule.