

SDSC 2102 Statistical Methods and Data Analysis
Assignment 3

Due: March 13, 2022 (Sunday) @10:00 pm

1. A laserprinter manufacturer recently received a complaint from a customer claiming the printer does not align the paper correctly; thus, the text is printed crooked on the page. The manufacturer would like to test if the problem exists for all laserprinters of this model.

If the paper is aligned correctly, the left edge of the text and the top edge of the paper should form a right angel. It is known that the angle formed by the left edge of the text and top edge of the paper follows a normal distribution with mean μ and variance 0.64 degrees^2 . Collecting data from 16 laserprinters, the sample mean is computed to be 89.4 degrees.

- (a) Conduct an appropriate 0.02 level test to address the manufacturer's concern. What do you conclude?
- (b) What is the smallest value of μ_0 for which we would fail to reject H_0 ?

2. A certain chemical must be stored at an average temperature of -20°F or lower. We want to know if a special type of freezer can do the job. The temperature of the freezer follows a normal distribution with mean μ and unknown variance σ^2 . After testing 25 freezers, we computed $\bar{x} = -20.7$, $\sum x_i^2 = 10,736.25$, $s^2 = 1.0$. Test an appropriate hypothesis at the 0.01 level. What do you conclude?

3. Two students proposed two different designs for their system in their course project. The first student performed 5 experiments to determine the number of customers served within 5 minutes and the second student performed 7 experiments for the same measure.

Student	Number of customers served within 5 minutes						
1	102	86	98	109	92		
2	81	165	97	134	92	87	114

- (a) What would each student obtain as their 90% confidence interval for the mean number of customers served within 5 minutes using their respective designs?
- (b) Is the mean number of customers under the second student's design higher than that under the first student's design? Use a significance level of 0.1 and assume equal variance.