Homework 6

STAT 212

Instructions

- The homework is due on **April 25, 2025**, 11:59 pm.
- The homework should be submited electronically via Canvas.
- Please upload a single PDF containing the solutions in the correct order. If you include scanned images, make sure that they are organized and easy to read.

---

1. (50 points) In a genetics experiment, investigators looked at 300 chromosomes of a particular type and counted the number of sister-chromatid exchanges on each ("On the Nature of Sister-Chromatid Exchanges in 5-Bromodeoxyuridine-Substituted Chromosomes", *Genetics, 1979: 1251-1264*). A Poisson model was hypothesized for the distribution of the number of exchanges, x. Test the fit of a Poisson distribution to the observed data below by first estimating θ and then combining the counts for $x \geq 8$ into one category.

Number of Exchanges	0	1	2	3	4	5	6	7	8	9
Observed Counts	6	24	42	59	62	44	41	14	6	2

2. (50 points) (Problem 11, on page 306 of textbook) It is claimed that the median increase in home owners' taxes in a certain county is \$300. A random sample of 20 home owners gives the following tax-increase data (arranged from smallest to largest): $137, 143, 176, 188, 195, 209, 211, 228, 233, 241, 260, 279, 285, 296, 312, 329, 342, 357, 412, 517$.

   (a) Does the data present strong enough evidence to conclude that the claim is false? State the null and alternative hypotheses and test at level $\alpha = 0.05$.

   (b) Does the data present strong enough evidence to con- clude that the median increase is less than 300? Test at level $\alpha = 0.05$.

3. Bonus problem: complete the course evaluation: https://tamu.aefis.net/.
   If more than 80% of the class completes the evaluation, 15 extra points will be added to everyone's score on this homework.