Directions

Scan and upload your *handwritten* solutions to eLearning by the end of the day on Monday, April 25. STAT functions are permitted for all problems where applicable but be sure to show organized steps of hypothesis testing. You may use either rejection regions or p-values (your choice).

Problem 1 (2 points)

An election was challenged in court because there was suspicion of fraudulent use of absentee ballots. The judge had to decide whether to overturn the election and remove the winner from office, and would do so if he believed the hypothesis that fraud was involved.

(a) State the hypotheses of the test.

(b) Expert witnesses presented statistical evidence that the P-value for testing these hypotheses is 0.06. The judge decided that fraud was involved and overturned the results of the election. Did the judge use a level of significance of $\alpha = 0.05$? Explain how you know and then state the level of significance used by the judge as an inequality.

Problem 2 (2 points)

The Harris Poll conducted a survey to determine how many tattoos people have on their bodies. Of the 1205 males surveyed, 181 had at least one tattoo. Of the 1097 females surveyed, 143 had at least one tattoo.

(a) A tattoo artist believes that only 10% of females have at least one tattoo. At $\alpha = 0.07$, test their claim using an appropriate significance test. (Note: You do not need data for the males in this part.)

(b) Determine whether the proportion of males with at least one tattoo differs from the proportion of females with at least one tattoo using an appropriate significance test at $\alpha = 0.05$.

Problem 3 (2 points)

Quiz scores for students A and B are given below in the table. At $\alpha = 0.05$, determine if the mean grades differ between the two students.

Student	Quiz 1	Quiz 2	Quiz 3	Quiz 4	Quiz 5	Quiz 6
A	85	92	97	65	75	96
B	81	79	76	84	83	77

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Problem 4 (2 points)

Zocor is a drug meant to reduce LDL (bad) cholesterol and increase HDL (good) cholesterol. In clinical trials, patients were divided into three groups (Group 1 = Zocor, Group 2 = placebo, and Group 3 = a competing drug). The table contains the number of patients in each group who did or did not experience abdominal pain as a side effect.

	Group A	Group B	Group C
Experienced Pain	51	5	16
Experienced No Pain	1532	152	163

(a) At $\alpha = 0.01$, determine if drug group and side effect are independent. (Show how you computed the expected values.)
(b) What does your result from (a) indicate about the homogeneity of the three groups?

Problem 5 (2 points)

Each day a baker bakes three large cakes. The number of cakes sold per day (0, 1, 2, or 3) over a period of 300 days are summarized in the first two columns of the table below. Use an

Cakes sold	Days
0	1
1	16
2	55
3	228

appropriate test at $\alpha = 0.05$ to determine whether the data may be from a binomial distribution with success probability $p = 0.85$. Show how you compute the probabilities and expected values.

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