

Math 1431 – Spring 2003 – Test #3 – Practice

You are allowed to use your calculator. Explain all answers – answers with no explanation will receive only partial credit. Use complete sentences. Show how you used the calculator to the questions below.

1. Find the following probabilities:

- a. The probability of drawing either a King or a diamond in a single draw from a deck of 52 playing cards.
 - b. The probability of drawing a King on the first draw, replacing the card, then drawing a diamond in a second draw from a deck of 52 playing cards.
 - c. The probability that two people draw a King of clubs from their own deck of 52 playing cards.
 - d. The probability that the sum of 2 dice will be greater than 8 given that the first die is a 6.
 - e. The probability that a 60% free throw shooter will make exactly 6 of 8 free throws.
 - f. The probability that a 60% free throw shooter will make at most 6 of 8 free throws.
 - g. The probability that a 60% free throw shooter will make more than 6 of 8 free throws.
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2. The dean of students of a large community college claims that the average distance that commuting students travel to school is 32 miles. The commuting students feel otherwise. A sample of 64 students was randomly selected and yielded a mean of 33.5 miles and a standard deviation of 5 miles. Test the dean's claim at the $\alpha = 0.01$ and $\alpha = 0.05$ levels of significance.

3. The mean and standard deviation for the GPA of a random sample of 100 students are 2.9 and 0.5 respectively.

- a. Find the 90%, 95% and 99% confidence intervals for the average GPA for all students in the school.
 - b. Find the minimum sample size needed for a margin of error of ± 0.32 and an 80% confidence interval.
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4. Sulfur compounds cause "off-odors" in wine, so winemakers want to know the odor threshold, the lowest concentration of a compound that the human nose can detect. The odor threshold for dimethyl sulfide (DMS) in trained wine tasters is about 25 $\mu\text{g/l}$ (micrograms per liter). The untrained noses of consumers may have a higher threshold, however. Here are the DMS odor thresholds for 10 untrained students:

31 31 43 36 23 34 32 30 20 24

Assume that the standard deviation of the odor threshold for untrained noses is known to be $\sigma = 7 \mu\text{g/l}$.

- a. Give a 95% CI for the mean DMS odor threshold among all students.
 - b. Are you convinced that the mean odor threshold for students is higher than the published threshold, 25 $\mu\text{g/l}$? Carry out a significance test with a $\alpha = 0.05$ significance level to justify your.
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5. A consumer group studied the service provided by fast-food restaurants in a given community. One of the things they looked at was the relationship between service and whether the server had a high school diploma or not. The information is summarized in the table below:

	Good Service	Poor Service	Total
HS diploma	61	28	89
No HS diploma	30	81	111
Total	91	109	200

- a. Find the probability of good service.
- b. Find the probability of good service given the server had a high school diploma.
- c. Find the probability of good service given the server did not have a high school diploma.