

Math 105-102
Elementary Probability & Statistics
Final, Spring 2005
Tools: Basic Calculator

[Show all work. No credits will be given without proper mathematical justification.]

1. (4 pts) Four names are drawn from the 24 members of a club for the offices of president, vice-president, treasurer, and secretary. In how many different ways can this be done?
2. (4 pts) There are 8 different statistics books, 6 different geometry books, and 3 different trigonometry books. A student must select one book of each type. How many different ways can this be done?
3. (7 pts) In Peterson, New Jersey about 25% of the days in a year are cloudy. Find the mean, variance and standard deviation for the number of cloudy days during the month of April (April has 30 days).
4. (7 pts) David and John work on a problem independently. The probability that David solves it is $\frac{2}{3}$ and the probability that John solves it is $\frac{4}{5}$. What is the probability that at least one of them solves it?
5. (6 pts) A coin is tossed 4 times. Find the mean, variance, and standard deviation of the number of heads that will be obtained.
6. (8 pts) In an advertisement, a drug store claims that its mean delivery time is less than 30 minutes. A random selection of 36 delivery times has a sample mean of 28.5 minutes and standard deviation of 3.5 minutes. Is there enough evidence to support the claim at $\alpha=0.01$? Use a P-value.
7. (6 pts) A college requires applicants to have an ACT score in the top 12% of all test scores. The ACT scores are normally distributed, with a mean of 21 and a standard deviation of 4.7.
 - a) Find the lowest test score that a student could get and still meet the college's requirement.
 - b) If 1500 are randomly selected, how many would be expected to have a test score that would meet the college's requirement?
8. (8 pts) The probability that a new drug will cure a certain blood disease is 0.7. It is administered to 100 patients. Find the probability that 60 to 70 of them will be cured.

9. (5 pts) A quiz has five multiple-choice questions with four possible answers to each. A student widely guesses that answers. What is the probability that the guesses exactly three correctly.
10. (9 pts) If 30% of the people in a community use the library in a year, find the following probabilities for a sample 15 people:
- At most 7 used the library
 - Exactly 7 used the library
 - At least 5 used the library
11. (5 pts) The growing seasons for a random sample of 35 U.S. cities were recorded, yielding a sample mean of 190.7 days and a sample standard deviation of 54.2 days. Estimate the population mean of the growing seasons with 95% confidence.
12. (7 pts) A report in *USA TODAY* stated that the national average age of commercial jets is 14 years. An executive of a large airline company selects a sample of 36 planes and finds the average age of the planes in his sample is 11.8 years. The standard deviation of the sample is 2.7 years. At $\alpha = 0.01$, is there evidence to support that the average age of the planes in his company is less than the national average?
13. (8 pts) A recent survey asked 100 people if they thought women in armed forces should be permitted to participate in combat. The results of the survey are shown in the table:

Gender	Yes	No
Male	32	18
Female	8	42

Find the following probabilities:

- The respondent answered yes, given that the respondent was a female.
 - The respondent was a male, given that the respondent answered no.
14. (6 pts) The following distribution shows the number of students enrolled in CPR classes offered by the local fire department. Find the mean, variance and standard deviation for the distribution.

No. of Students	12	13	14	15	16
Probability $P(X)$	0.15	0.20	0.38	0.18	0.09

15. (10 pts) Find the regression line y on x . Use this fitted regression line to find the estimated y for $x=7$.

No. of ads x	2	5	8	8	10	12
Sales y , \$	2	4	7	6	9	10