

Statistics (Math 141)

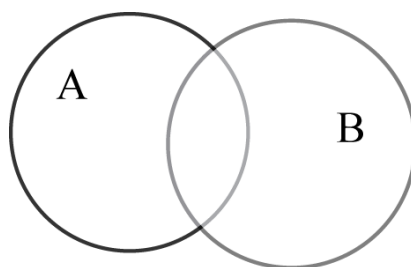
Homework: B4**Instructions**

Please complete all problems. Unless otherwise noted, each problem is worth 5 points. To obtain full credit, you must use the methods specified in the course text. *Please*, format your work as explained in chapter 2 of the Frequently Asked Questions (FAQ) document. When doing calculations, such as the variance, standard deviation, or the correlation coefficient, use technology wherever possible. There is no need to do calculations by hand unless I direct you to do so. You can find suggestions for doing charts in chapter 5 of the FAQ document. When graphing by hand, remember to use graph paper. Round all calculations to three decimal places.

Allow time. This unit and the next one are generally considered by students to be among the most difficult for the course. Be sure to allow adequate time to complete the necessary assignment tasks.

Assignment Problems**Section 3.3**

1. **Mutually exclusive events.** If events A and B are mutually exclusive, then what is the value of $P(A \text{ And } B)$?
2. Use Figure 1 to answer the question. Are events A and B shown in Figure 1 mutually exclusive?

Figure 1. Venn diagram showing events A and B.

Problem 3-6. Use Table 1 to answer the questions. A sample of people were checked to see which hand they favored. The results from the sample are shown in Table 1. A person is selected at random from the sample.

Table 1. Left-handed Persons

	Men	Women	Total
Left-handed	86	89	175
right-handed	747	857	1604
Total	833	946	1779

3. Find the probability that the person is right-handed or a woman.
4. Find the probability that the person is left-handed or a man.
5. Find the probability that the person is a left-handed woman.
6. Are the events "being left-handed" and "being a woman" mutually exclusive?

Section 3.4

7. **Calculate.** ${}_{12}C_5$
8. **Assembly Process.** There are five processes involved in assembling a certain product. These processes can be performed in any order. Management wants to find which order is the least time-consuming. How many different orders will have to be tested?

Problems 9-10. The offices of president, vice president, secretary, and treasurer for an environmental club will be filled from a pool of 15 candidates. Seven of the candidates are members of the debate team.

9. What is the probability that none of the offices are filled by members of the debate team?
10. What is the probability that all of the offices are filled by members of the debate team?

Section 4.1

11. **Determine if the random variable x is discrete or continuous. Explain your reasoning.** x represents the number of dangerous weather events in the state of Illinois in 2020.

Problems 12-16. Use the probability distribution in Table 2 to answer the questions. A 911 service center recorded the number of calls received per hour. The number of calls per hour for 1 week can be approximated as shown in Table 2.

Table 2. Probability distribution for 911 service center calls

x	0	1	2	3	4	5	6	7
$P(x)$	0.092	0.116	0.153	0.177	0.141	0.112	0.108	0.101

12. What is the mean of the probability distribution?
13. What is the variance of the probability distribution?
14. What is the standard deviation of the probability distribution?

15. What is the expected value of the probability distribution?
16. Interpret the results. (*Note:* Follow example of interpretations in the worked examples.)

Section 4.2

Problems 17-19. Answer the questions. A binomial distribution has $n = 122$ and $p = 0.73$

17. What is the mean of the binomial distribution?
18. What is the variance of the binomial distribution?
19. What is the standard deviation of the binomial distribution?

Problems 20-22. Answer the questions. Nine students are randomly selected from a math course. You are told there is a 77% chance of successfully completing the course.

20. What is the probability that exactly four students successfully complete the course?
21. What is the probability that at least 6 students successfully complete the course?
22. What is the probability that less than 6 students successfully complete the course?

Problems 23-25. Sixty-two percent of workers say they commute more than 15 miles to work. You randomly select 20 workers and ask if they commute more than 15 miles to work.

23. What is the probability that exactly ten workers say they commute more than 15 miles to work?
24. What is the probability that more than 16 workers say they commute more than 15 miles to work?
25. What is the probability that between eight and ten (inclusive) workers say they commute more than 15 miles to work?