

University of California, Los Angeles
Department of Statistics

Statistics 13

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Exam 2 - practice problems

Problem 1

The weight X of water melons produced at the Southland Melons Company is a normal random variable with mean $\mu = 8$ pounds and standard deviation $\sigma = 2$ pounds. Suppose 16 water melons are randomly selected.

- a. Describe the distribution of the sample mean weight ($\bar{X}$) of these 16 water melons.
- c. What is the probability that the sample mean of these 16 water melons will exceed 9 pounds?
- d. The probability that the sample mean exceeds b is 97.5%. Find b .

Problem 2

One hundred patients will receive a certain drug to determine its effectiveness. The drug will be effective if at least 65 of the 100 people show some improvement. Suppose that there is a 62% probability that a patient who receives this drug will show some improvement. Assume that this probability is the same for all patients.

- a. Write an expression for the exact probability that the drug will be effective.
- b. Approximate the above probability using the normal distribution.

Problem 3

Answer the following questions:

- a. Tow dice are rolled repeatedly until you roll a sum of 8. What is the probability that the sum of 8 will occur on or after the 5th trial?
- b. A basket contains 20 fruits of which 10 are oranges, 8 are apples, and 2 are tangerines. You randomly select 5 and give them to your friend. What is the probability that among the 5 your friend will get 2 tangerines?
- c. Two dice are rolled 8 times. What is the probability that 4 of the 10 outcomes is the sum of 5?
- d. Let $X \sim N(8, 2)$. Find $P(X > 13 | X > 10)$.

Problem 4

A television cable company receives numerous phone calls throughout the day from customers reporting service troubles and from would-be subscribers to the cable network. Most of these callers are put “on hold” until a company operator is free to help them. The company has determined that the length of time a caller is on hold is normally distributed with a mean of 3.1 minutes and a standard deviation 0.9 minutes. Company experts have decided that if as many as 5% of the callers are put on hold for 5.0 minutes or longer, more operators should be hired.

- a. What proportion of the company’s callers are put on hold for less than 5.0 minutes? Should the company hire more operators? Show these probabilities on a sketch of the normal curve.
- b. At another cable company (length of time a caller is on hold follows the same distribution as before), 2.5% of the callers are put on hold for less than x minutes. Find the value of x , and show this on a sketch of the normal curve.