

More Review Problems

1. A particularly common question in the study of wildlife behavior involves observing contests between “residents” of a particular area and “intruders.” In each contest, the “residents” either win or lose the encounter (assuming there are no ties). Observers might record several variables, some of which are listed below. Determine which variables are categorical and which ones are quantitative.
 - (a) The duration of the contest (in seconds).
 - (b) The number of animals involved in the contest.
 - (c) Whether the “residents” win or lose.
 - (d) The total number of contests won by the “residents.”

2. Of the quantitative variables identified in Problem 1, which ones are continuous and which ones are discrete?

3. The asking prices (in thousands of dollars) for a sample of 13 houses currently on the market in Neighborville are listed below. For convenience, the data have been ordered.

175 199 205 234 259 275 299 304 317 345 355 384 549

 - (a) What is the five-number summary?
 - (b) Use the $1.5 \times \text{IQR}$ rule to determine if there are any outliers present. What is/are the value(s) of the outlier(s)?
 - (c) Sketch a boxplot of the data.

4. A study was conducted in a large population of adults concerning eyeglasses for correcting reading vision. Based on an examination by a qualified professional the individuals were judged as to whether or not they needed to wear glasses for reading. In addition it was determined whether or not they were currently using glasses for reading. Table 1 provides the proportions found in the study:

Need Glasses? \ Used Glasses?	Yes	No
Yes	0.42	0.18
No	0.04	0.36

Table 1: Proportions for Problem 4

- (a) If a single adult is selected at random from this large population, what is the probability that the adult is judged to need eyeglasses for reading?
- (b) What is the probability that the selected adult is judged to need eyeglasses but does not use them for reading?
- (c) Suppose two adults are selected from the population independently, and at random. What is the probability that both were judged to need eyeglasses and neither was using them for reading?
5. A company is being criticized because only 3 of 16 people in executive-level positions are female. The company claims that although the number is lower than it might wish, it is not surprising given the fact that only 40% of their employees are women. Suppose we can consider the 16 people in executive-level positions as a simple random sample of all employees. What is the probability of observing 3 or fewer women in the group of 16 executives?
6. The scores in the second midterm of this course had a mean of 85.35 and a standard deviation of about 8.16. If the scores were normally distributed then we would expect to see the following distribution of scores:

10 7 3 7 10

in a class of 37 in the ranges

score ≤ 80.45 ,

$80.45 < \text{score} \leq 84.53$,

$84.53 < \text{score} \leq 86.18$,

$86.18 < \text{score} \leq 90.25$,

score > 90.25 ,

respectively. The actual distribution was

11 5 3 6 12

Perform a goodness of fit test to determine if the distribution of scores is close to normal.