Statistics
Semester Review KEY

1. A researcher hypothesizes that the average number of sports that colleges offer for males is greater than the average number of sports that colleges offer for females. If the average number of sports that colleges offer for males in a sample of 53 is 8.7 with a standard deviation of 3.1, and the average number of sports that colleges offer for females in a sample of 53 is 8.1 with a standard deviation of 3.5, would there be enough evidence to support the claim at α = 0.1? Assume equal but unknown population standard deviations.

   Critical value = 1.282 Observed value = 0.93; Do Not Reject

2. The following table shows the number of on time and late trains for Train A and Train B.

   Are "Train A" and "Late" independent events?

	On time	Late
Train A	35	13
Train B	45	7

   P(Train A) = 0.48 and P(Train A | Late) = 0.65; Since P(Train A) ≠ P(Train A | Late), the events are not independent

3. Ataxia-telangiectasia (A-T) is a neurological disorder that weakens immune systems and causes premature aging. When both members of a couple carry the A-T gene, their children have a 20% chance of developing the disease. Consider 15 couples in which both members of each couple carry the A-T gene. What is the probability that exactly 8 of the 15 couples will have children that develop the neurological disorder?

   0.0035

4. In order to qualify for police academy training, recruits are given a test of stress tolerance. The scores are normally distributed with a mean of 60 and a standard deviation of 10. If only the top 20% of recruits are selected, what is the cutoff score for selection to the police academy?

   68.4

5. It is believed that 25% of US homes have a direct satellite television receiver. How large a sample is necessary to estimate the true proportion of homes which have a satellite with a 95% confidence interval and a margin of error of 3%?

   n = 801

6. Lice are a pesky problem for school-aged children and are unrelated to cleanliness. The lifetimes of lice that have fallen off the scalp onto bedding is approximately normally distributed with a mean of 2.2 days and a standard deviation of 0.4 days. In how many days would we expect 90% of the lice to die?

2.7 days

7. Two cards are drawn from a standard deck of 52 cards without replacement. What is the probability that both cards will be a face card or a 5?

0.0543

8. The average age of a registered automobile in the U.S. is 8 years or 96 months. Assume the population standard deviation is 16 months. If a random sample of 36 vehicles is selected, find the probability that the mean age is between 90 and 100 months.

0.921

9. The ages for 11 children taking an amoxicillin antibiotic are given as follows.

    8 9 9 10 10 11 11 12 14 14 17

    Find the mean, median, and standard deviation.

Mean = 11.36; Median = 11; st. dev. = 2.69

10. The average labor charge for automobile mechanics is $54 per hour. The standard deviation is $4. Find the minimum percentage of data values that will fall within the range of $48 and $60.

At least 56%