

## Exercises

8-26. (W) What are the properties of the  $t$  distribution?

8-27. (W) Who developed the  $t$  distribution?

8-28. (W) What is meant by degrees of freedom?

8-29. (W) When should the  $t$  distribution be used to find a confidence interval for the mean?

8-30. (ans) Find the values for each.

a.  $t_{\alpha/2}$  and  $n = 18$  for the 99% confidence interval for the mean

b.  $t_{\alpha/2}$  and  $n = 23$  for the 95% confidence interval for the mean

c.  $t_{\alpha/2}$  and  $n = 15$  for the 98% confidence interval for the mean

d.  $t_{\alpha/2}$  and  $n = 10$  for the 90% confidence interval for the mean

e.  $t_{\alpha/2}$  and  $n = 20$  for the 95% confidence interval for the mean

For Exercises 8-31 through 8-46, assume that all variables are approximately normally distributed.

8-31. The average hemoglobin reading for a sample of 20 teachers was 16 grams per 100 milliliters, with a sample standard deviation of 2 grams. Find the 99% confidence interval of the true mean.

8-32. A meteorologist who sampled 15 cold weather fronts found that the average speed at which they traveled across a certain state was 18 miles per hour. The standard deviation of the sample was 2 miles per hour. Find the 95% confidence interval of the mean.

8-33. A sample of 25 two-year-old chickens shows that they lay an average of 21 eggs per month. The standard deviation of the sample was 2 eggs. Find the 99% confidence interval of the true mean.

8-34. A sample of 20 tuna showed that they swim an average of 8.6 miles per hour. The standard deviation for the sample was 1.6. Find the 90% confidence interval of the true mean.

8-35. A sample of 6 adult elephants had an average weight of 12,200 pounds, with a sample standard deviation of 200 pounds. Find the 95% confidence interval of the true mean.

8-36. It has been reported that the average daily intake of calories for young women is 1667. To see if this is valid for nurses, a researcher sampled 15 nurses and found their average daily intake of calories was

1593. The standard deviation of the sample was 38 calories. Find the 90% confidence interval of the mean. Can the researcher conclude that the mean for nurses is the same as the mean for all women?

8-37. A recent study of 28 city residents showed that the mean of the time they had lived at their present address was 9.3 years. The standard deviation of the sample was 2 years. Find the 90% confidence interval of the true mean.

8-38. An automobile shop manager timed six employees and found that the average time it took them to change a water pump was 18 minutes. The standard deviation of the sample was 3 minutes. Find the 90% confidence interval of the true mean.

8-39. A recent study of 25 students showed that they spent an average of \$18.53 for gasoline per week. The standard deviation of the sample was \$3.00. Find the 95% confidence interval of the true mean.

8-40. For a group of 10 men subjected to a stress situation, the mean number of heartbeats per minute was 126, and the standard deviation was 4. Find the 95% confidence interval of the true mean.

8-41. For the stress test described in Exercise 8-40, six women had an average heart rate of 115 beats per minute. The standard deviation of the sample was 6 beats. Find the 95% confidence interval of the true mean for the women.

8-42. For a sample of 24 operating rooms taken in the hospital study mentioned in Exercise 8-19, the mean noise level was 41.6 decibels, and the standard deviation was 7.5. Find the 95% confidence interval of the true mean of the noise levels in the operating rooms. Source: M. Bayo, A. Garcia, and A. Garcia, "Noise Levels in an Urban Hospital and Workers' Subjective Responses," *Archives of Environmental Health* 50, no. 3 (May/June 1995).

8-43. A sample of 15 food servers showed an average weekly income of \$320.20. The standard deviation of the sample was \$12. Find the 98% confidence interval of the true mean.

8-44. For a group of 20 students taking a final exam, the mean heart rate was 96 beats per minute, and the standard deviation was 5. Find the 95% confidence interval of the true mean.

8-45. The average yearly income for 28 married couples living in city C is \$58,219. The standard