1. The EPA reports that the exhaust emissions for a certain car model has a mean of 1.45 grams of nitrous oxide per mile and a standard deviation of 0.4. A SRS of 28 cars is taken and the mean level of exhaust emitted for this sample is 2.21 grams.

(a) State the null and alternative hypotheses with words and symbols.

(b) Calculate the z-score.

(c) Calculate the p-value.

(d) What is the decision at the 0.05 significance level?

(e) What do you conclude about the mean level of exhaust emitted for this car model?

2. The amount of water consumed per week by Montana residences has a mean of 120 gallons and a standard deviation of 10 gallons. A simple random sample of ten residences found that the mean amount of water consumed was 112 gallons.

(a) State the null and alternative hypotheses with words and symbols.

(b) Calculate the z-score.

(c) Calculate the p-value.

(d) Make a decision at a 0.05 significance level.

(e) What will the City of Bozeman conclude about the average amount of water consumed per week by Montana residences?

3. A credit card company wondered whether giving frequent flyer miles for every purchase would increase card usage, which has a current mean of $2500 per year. They gave free miles to a SRS of 51 credit card customers and found the sample mean to be $2542. Assume the population standard deviation is $109.

(a) State the null and alternative hypotheses with words and symbols.

(b) Calculate the z-score.

(c) Calculate the p-value.

(d) Make a decision at a 0.05 significance level.

(e) State your conclusion in terms of the problem.

4. Studies conducted in the 1970s indicated that the average age at which children take their first alcoholic drink is 14.6 years old. Sociologists believe that children are starting to drink at a younger age. A SRS of 144 young adults (18 years of age) is selected and the age at which each adult took their first alcoholic drink is recorded. The sample mean age was 10.1 years of age. The population standard deviation is known to be 2 years.

(a) State the null and alternative hypotheses with words and symbols.

(b) Calculate the z-score.

(c) Calculate the p-value.

(d) Make a decision at a 0.05 significance level.

(e) What do you conclude about the mean age at which children take their first alcoholic drink?