A Better Golf Club?

Mike is an avid golfer who would like to improve his play. A friend suggests getting new clubs and lets Mike try out his 7-iron. Based on years of experience, Mike has established that the mean distance that balls travel when hit with his old 7-iron is \( \mu = 175 \) yards with a standard deviation of \( \sigma = 15 \) yards. He is hoping that this new club will make his shots with a 7-iron more consistent (less variable), so he goes to the driving range and hits 50 shots with the new 7-iron.

(a) Describe the parameter of interest in this setting.

(b) State appropriate hypotheses for performing a significance test.

Based on 50 shots with the new 7-iron, the standard deviation was \( s_x = 10.9 \) yards. A significance test using the sample data produced a P-value of 0.002.

(c) Interpret the P-value in this context.

(d) Do the data provide convincing evidence against the null hypothesis? Explain.

(e) Interpret the result in part d in context.
State the appropriate null hypothesis $H_0$ and alternative hypothesis $H_a$ in each case. Be sure to define your parameter each time.

2. A Gallup Poll report on a national survey of 1028 teenagers revealed that 72% of teens said they seldom or never argue with their friends. Yvonne wonders whether this national result would be true in her large high school. So she surveys a random sample of 150 students at her school.

Hypothesis:

For Yvonne’s survey, 96 students in the sample said they rarely or never argue with friends. A significance test yields a P-value of 0.0291.

(a) Interpret this result in context.

(b) Do the data provide convincing evidence against the null hypothesis? Explain.

2. Hemoglobin is a protein in red blood cells that carries oxygen from the lungs to body tissues. People with less than 12 grams of hemoglobin per deciliter of blood (g/dl) are anemic. A public health official in Jordan suspects that Jordanian children are at risk of anemia. He measures a random sample of 50 children.

Hypothesis:

For the study of Jordanian children, the sample mean hemoglobin level was 11.3 g/dl and the sample standard deviation was 1.6 g/dl. A significance test yields a P-value of 0.0016.

(a) Interpret the P-value in context.

(b) What conclusion would you make if $\alpha = 0.05$? $\alpha = 0.01$? Justify your answer.