1. A Better Golf Club?

(a) Since Mike is interested in being more consistent, the parameter of interest is the standard deviation of the distance he hits the ball when using the new 7-iron.

(b) Because Mike wants to be more consistent, he wants the standard deviation of the distance he hits the ball to be smaller than 15 yards.

\( H_0 : \sigma = 15 \)

\( H_a : \sigma < 15 \)
(c) We have a 0.2% chance of obtaining a value as extreme as $S_x = 10.9$ due to random chance alone.

(d) Yes. Since the $P$-value is very small, random chance is not a plausible explanation, therefore, there is convincing evidence that the true standard deviation with the new 7-iron is smaller.

(e) Mike is more consistent when using the new 7-iron (i.e. the true standard deviation of distances when using the new 7-iron is less than 15 yards).
2. **Hypothesis:**

   \( p \) = true proportion of teens that seldom or never argue with friends

   Ho: \( p = 0.72 \)

   Ha: \( p \neq 0.72 \)

*Hint: “would be true” does not give a direction.*
(a) If the proportion of students at Yvonne’s school who say they rarely or never argue with friends is actually 0.72, there is a 2.91% chance of finding a sample of 150 students with a value of $p$ that is as far from 0.72 as the sample value (96 students) in either direction.

(b) Yes. This outcome was fairly rare (only 2.91% chance of happening) so we would likely reject the null hypothesis. It appears that the percent of students at Yvonne’s school is different from the national percent.
3. Hypothesis:

\[ \mu = \text{true hemoglobin level per deciliter of blood} \]

Ho: \( \mu = 12 \)

Ha: \( \mu < 12 \)
(a) If the mean hemoglobin level of Jordanian children was really 12 g/dl, there is a 0.16% chance of finding a sample of 50 children with a mean level of 11.3 or lower.

(b) Since the P-value is less than both 0.05 and 0.01, we would reject the null hypothesis in both cases. It appears that Jordanian children have an average hemoglobin level that is less than 12 mg/dl and as such are at risk for anemia.