

Yates w.s. (Review topics 16-18)
proportions

12.13 DRUNKEN CYCLISTS? In the United States approximately 900 people die in bicycle accidents each year. One study examined the records of 1711 bicyclists aged 15 or older who were fatally injured in bicycle accidents between 1987 and 1991 and were tested for alcohol. Of these, 542 tested positive for alcohol (blood alcohol concentration of 0.01% or higher).⁸

- (a) Find a 95% confidence interval for p . ~~Is there a divergence between~~
- (b) Can you conclude from your statistical analysis of this study that alcohol causes fatal bicycle accidents? Explain.

12.18 CUSTOMER SATISFACTION An automobile manufacturer would like to know what proportion of its customers are not satisfied with the service provided by their local dealer. The customer relations department will survey a random sample of customers and compute a 99% confidence interval for the proportion who are not satisfied.

- (a) From past studies, they believe that this proportion will be about 0.2. Find the sample size needed if the margin of error of the confidence interval is to be about 0.015.
- (b) When the sample is actually contacted, 10% of the sample say they are not satisfied. What is the margin of error of the 99% confidence interval?

12.19 HACK-A-SHAQ Any Los Angeles Lakers fan or archrival knows the team's very large "SHAQilles heel"—the free-throw shooting of the NBA's most valuable player during the 2000 season, Shaquille O'Neal. Over his NBA career, Shaq has made 53.3% of his free throws.

Shaquille O'Neal worked in the off-season with Assistant Coach Tex Winter on his free-throw technique. During the first two games of the next season, Shaq made 26 out of 39 free throws.

(a) Do these results provide evidence that Shaq has improved his free-throw shooting?
~~Follow the Inference Toolbox.~~

(b) Describe a Type I error and a Type II error in this situation.

power ★ (c) Suppose that Shaq has actually improved his free-throw shooting percentage to 60%. What is the probability that you will correctly reject the claim that $p = 0.533$? Use a 5% significance level.

★ (d) Find the probability of a Type I error and a Type II error.