Chapter 8

Hypotheses Tests

8.1 Hypotheses and Test Procedures

8.2 z-Tests for Hypotheses about a Population Mean

8.3 The One-Sample t-Test

8.4 Tests Concerning a Population Proportion

292

Summary for H_0: $p=p_0$

Test statistic value: $z = \frac{\hat{p}-p_0}{\sqrt{p_0(1-p_0)/n}}$

H_a: $p>p_0$ reject when $z \geq z_\alpha$ (upper-tailed test)

H_a: $p<p_0$ reject when $z \leq -z_\alpha$ (lower-tailed test)

H_a: $p \neq p_0$ reject when $z \geq z_{\alpha/2}$ or $z \leq -z_{\alpha/2}$ (two-tailed test)

Use this when $np_0 \geq 10$ and $n(1-p_0) \geq 10$.

293

Example

The producer of a drug claims that their company's drug cures a certain disease with probability 0.9. A hospital uses this drug with 400 patients. 340 of them were cured.

Can we reject the producer's claim with α=0.01?

294

Example

A package-delivery service advertises that at least 90% of all packages brought to its office by 9 a.m. for delivery in the same city are delivered by noon that day. Consider H_0: p=0.9 vs H_a: p<0.9.

a. If only 80% of the packages are delivered as advertised, how likely is it that a level 0.01 test based on 225 packages will detect such a departure from H_0?

b. What should the sample size be to ensure that β(0.8)=0.01?

295