Chapter 9

Inferences Based on Two Samples

9.1 z-Tests

9.2 The Two-Sample t-Test

9.4 Difference Between Population Proportions

9.5 Two-Population Variances

Summary for H_0: $\mu_1-\mu_2=\Delta_0$

Test statistic value: $$z=\frac{\bar{x}-\bar{y}-\Delta_0}{\sqrt{\frac{\sigma_1^2}{m}+\frac{\sigma_2^2}{n}}}$$

H_a: $\mu_1-\mu_2>\Delta_0$ **reject when $z\geq z_\alpha$ (upper-tailed test)**

H_a: $\mu_1-\mu_2<\Delta_0$ **reject when $z\leq -z_\alpha$ (lower-tailed test)**

H_a: $\mu_1-\mu_2\neq\Delta_0$ **reject when $z\geq z_{\alpha/2}$ or $z\leq -z_{\alpha/2}$ (two-tailed test)**

Example

Analysis of a random sample consisting of 20 specimens of cold-rolled steel to determine yield strengths resulted in a sample average strength of 29.8 ksi. A second random sample of 25 two-sided galvanized steel specimens gave a sample average strength of 34.7 ksi.

Assuming that the two yield-strength distributions are normal with standard deviations 4 and 5, respectively, does the data indicate the corresponding true average yield strengths are different? Use significance level 0.01.