5. H_0: $\sigma_1 = \sigma_2$. H_1: $\sigma_1 \neq \sigma_2$. Test statistic: $F = 1.7341$. Upper critical F value is between 1.8752 and 2.0739 (Tech: 1.9611). P-value: 0.1081. Fail to reject H_0. There is not sufficient evidence to support the claim that weights of regular Coke and weights of regular Pepsi have different standard deviations.
7. H_0: $\sigma_1 = \sigma_2$. H_1: $\sigma_1 \neq \sigma_2$. Test statistic: $F = 1.1592$. Upper critical F value is between 1.8752 and 2.0739 (Tech: 1.9678). P-value: 0.6656. Fail to reject H_0. There is not sufficient evidence to warrant rejection of the claim that the samples are from populations with the same standard deviation. The background color does not appear to have an effect on the variation of word recall scores.
9. H_0: $\sigma_1 = \sigma_2$. H_1: $\sigma_1 > \sigma_2$. Test statistic: $F = 9.3364$. Critical F value is between 12.0540 and 2.0960 (Tech: 2.0842). P-value: 0.0000. Reject H_0. There is sufficient evidence to support the claim that the treatment group has errors that vary more than the errors of the placebo group.
11. H_0: $\sigma_1 = \sigma_2$. H_1: $\sigma_1 > \sigma_2$. Test statistic: $F = 2.1267$. Critical F value is between 2.1555 and 2.2341 (Tech: 2.1682). P-value: 0.0543. Fail to reject H_0. There is not sufficient evidence to support the claim that those given a sham treatment (similar to a placebo) have pain reductions that vary more than the pain reductions for those treated with magnets.
13. H_0: $\sigma_1 = \sigma_2$. H_1: $\sigma_1 > \sigma_2$. Test statistic: $F = 4.1648$. Critical F value is between 2.7876 and 2.8536 (Tech: 2.8179). P-value: 0.0130. Reject H_0. There is sufficient evidence to support the claim that amounts of strontium-90 from Pennsylvania residents vary more than amounts from New York residents.
15. H_0: $\sigma_1 = \sigma_2$. H_1: $\sigma_1 \neq \sigma_2$. Test statistic: $F = 1.0073$. Upper critical F value: 4.0260. P-value: 0.9915. Fail to reject H_0. There is not sufficient evidence to warrant rejection of the claim that females and males have heights with the same amount of variation.
17. H_0: $\sigma_1 = \sigma_2$. H_1: $\sigma_1 > \sigma_2$. Test statistic: $F = 1.2397$. Critical F value is between 1.6928 and 1.8409 (Tech: 1.7045). P-value: 0.2527. Fail to reject H_0. There is not sufficient evidence to support the claim that males have weights with more variation than females.
19. $c_1 = 4$, $c_2 = 0$, critical value is 5. Fail to reject $\sigma_1^2 = \sigma_2^2$.
21. 0.2727, 2.8365

Chapter 9: Quick Quiz

1. H_0: $p_1 = p_2$. H_1: $p_1 \neq p_2$.
2. 0.875
3. 0.0414
4. $0.00172 < p_1 - p_2 < 0.0970$
5. Because the data consist of matched pairs, they are dependent.
6. H_0: $\mu_d = 0$. H_1: $\mu_d > 0$.
7. There is not sufficient evidence to support the claim that front repair costs are greater than the corresponding rear repair costs.
8. F distribution
9. False.
10. True.

Chapter 9: Review Exercises

1. H_0: $p_1 = p_2$. H_1: $p_1 > p_2$. Test statistic: $z = 3.12$. Critical value: $z = 2.33$. P-value: 0.0009. Reject H_0. There is sufficient evidence to support a claim that the proportion of successes with surgery is greater than the proportion of successes with splinting. When treating carpal tunnel syndrome, surgery should generally be recommended instead of splinting.
2. 98% CI: $0.0581 < p_1 - p_2 < 0.332$ (Tech: $0.0583 < p_1 - p_2 < 0.331$). The confidence interval limits do not contain 0; the interval consists of positive values only. This suggests that the success rate with surgery is greater than the success rate with splints.
3. H_0: $p_1 = p_2$. H_1: $p_1 < p_2$. Test statistic: $z = -1.91$. Critical value: $z = -1.645$. P-value: 0.0281 (Tech: 0.0280). Reject H_0. There is sufficient evidence to support the claim that the fatality rate of occupants is lower for those in cars equipped with airbags.
4. H_0: $\mu_d = 0$. H_1: $\mu_d > 0$. Test statistic: $t = 4.712$. Critical value: $t = 3.143$. P-value < 0.005 (Tech: 0.0016). Reject H_0. There is sufficient evidence to support the claim that flights scheduled 1 day in advance cost more than flights scheduled 30 days in advance. Save money by scheduling flights 30 days in advance.
5. H_0: $\mu_d = 0$. H_1: $\mu_d \neq 0$. Test statistic: $t = -0.574$. Critical values: $t = \pm 2.365$. P-value > 0.20 (Tech: 0.5840). Fail to reject H_0. There is not sufficient evidence to support the claim that there is a difference between self-reported heights and measured heights of females aged 12–16.
6. H_0: $\mu_1 = \mu_2$. H_1: $\mu_1 > \mu_2$. Test statistic: $t = 2.879$. Critical value: $t = 2.429$ (Tech: 2.376). P-value < 0.005 (Tech: 0.0026). Reject H_0. There is sufficient evidence to support the claim that "stress decreases the amount recalled."
7. 98% CI: $1.3 < (\mu_1 - \mu_2) < 14.7$ (Tech: $1.4 < (\mu_1 - \mu_2) < 14.6$). The confidence interval limits do not contain 0; the interval consists of positive values only. This suggests that the numbers of details recalled are lower for those in the stress population.
8. H_0: $p_1 = p_2$. H_1: $p_1 \neq p_2$. Test statistic: $z = -4.20$. Critical values: $z = \pm 2.575$. P-value: 0.0002 (Tech: 0.0000). Reject H_0. There is sufficient evidence to warrant rejection of the claim that the acceptance rate is the same with or without blinding. Without blinding, reviewers know the names and institutions of the abstract authors, and they might be influenced by that knowledge.
9. H_0: $\mu_1 = \mu_2$. H_1: $\mu_1 \neq \mu_2$. Test statistic: $t = 0.679$. Critical values: $t = \pm 2.014$ approximately (Tech: ± 1.985). P-value > 0.20 (Tech: 0.4988). Fail to reject H_0. There is not sufficient evidence to warrant rejection of the claim of no difference between the mean LDL cholesterol levels of subjects treated with raw garlic and subjects given placebos. Both groups appear to be about the same.
10. H_0: $\sigma_1 = \sigma_2$. H_1: $\sigma_1 \neq \sigma_2$. Test statistic: $F = 1.1480$. Upper critical F value is between 1.6668 and 1.8752 (Tech: 1.7799). P-value: 0.6372. Fail to reject H_0. There is not sufficient evidence to warrant rejection of the claim that the two populations have LDL levels with the same standard deviation.