Math 425 - Homework 4

Due Monday 03/11

Unless otherwise instructed, conduct all hypothesis tests at the $\alpha = .05$ level. The numbers associated with each problem come from various editions of the text, so don't be surprised if they do not match yours.

1. *Problem 9.14:* A librarian claims that, on average, her library's books are more than 20 years old. To test this, a students takes a sample of $n = 30$ books and notices that they have an average age of $\bar{X} = 23.8$ and a sample variance of $s^2 = 67.5$. Use this sample to conduct a one-tailed test with $\alpha = .01$ to determine whether the average age to the library books is significantly greater than 20 years ($\mu > 20$).

2. *Problem 10.4:* Describe the homogeneity of variance assumption and explain why it is important for the independent-measures (2 sample) t-test.

3. *Problem 10.5:* One sample has $SS_1 = 48$ and a second has $SS_2 = 32$. **a)** If $n = 5$ for both samples find each of the sample variances and compute the pooled variance. **b)** Suppose $n_1 = 5$ and $n_2 = 9$. Again compute the sample and pooled variances. **c)** Explain the effect that occurred when n was changed.

4. *Problem 10.9* Two samples received different treatments. The first sample has $n_1 = 9$ with $SS_1 = 710$ and the second sample has $n_2 = 6$ with $SS_2 = 460$. **a)** Compute the pooled variance for the two samples. **b)** Calculate the estimated standard error for the sample mean difference. **c)** If the sample mean difference is 10 points, is this enough to reject the null hypothesis using a two-tailed test with $\alpha = .05$? **d)** If the sample mean difference is 13 points, is this enough to reject H_0 using a two-tailed test with $\alpha = .05$?

5. *Problem 10.17* I have invented a new style of dancing, that men seem to love and women seem to hate. Conduct a two-tailed test at $\alpha = .01$ significance on the following data of how much (on a scale of 1 to 100) people love my new dance.

Men	Women
$n = 15$	$n = 15$
$\bar{X} = 40.8$	$\bar{X} = 34.0$
$SS = 510$	$SS = 414$