

## Problem Set 3

Out: October 26

Due: November 10

1. A manufacturer of paper products wants to compare the variation in daily production levels at two paper mills. Independent random samples of days are selected from each mill, and the production levels (in units) are recorded. The data are show in the table below. Do the data provided provide evidence to indicate a difference in the population variances at the two paper mills. Use  $\alpha = 0.10$ .

Mill 1:	34	18	28	21	40	23	29		
	25	10	38	32	22	22			
Mill 2:	31	13	27	19	22	18	23	22	21
	18	15	24	13	19	18	19	23	13

2. Construct a 95% confidence interval for the difference,  $\rho_1 - \rho_2$ , in each of the following situations:
- $n_1 = 400, \hat{\rho}_1 = 0.65, n_2 = 400, \hat{\rho}_2 = 0.58$
  - $n_1 = 180, \hat{\rho}_1 = 0.31, n_2 = 250, \hat{\rho}_2 = 0.25$
  - $n_1 = 100, \hat{\rho}_1 = 0.46, n_2 = 120, \hat{\rho}_2 = 0.61$
3. A consumer advocacy group wants to determine whether there is a difference between proportions of the two leading automobile models that need major repairs within 2 years of purchase. A sample of 400 two-year owners of model 1 is contacted, and a sample of 500 two-year owners of model 2 is contacted. The numbers  $X_1$  and  $X_2$  of owners who report that their cars needed major repairs within the first two years are 53 and 78, respectively. Test the null hypothesis that no difference exists between the proportions in population 1 and 2 needing major repairs against the alternative that a difference does exist. Use  $\alpha = 0.10$
4. Suppose you select independent random samples of five female and five male high school seniors and record their SAT scores. The data is shown below. Based on this data, calculate the sum of squares for groups (SSG), error (SSE), and total (SST).

Table 1: SAT scores for High School Students

Females	Males
539	490
560	520
590	550
620	580
650	610