

**Statistics 506**  
**Test 2**

1. An experimenter ran a fractional factorial design—4 factors in 8 runs ( $D=ABC$ ). A follow-up foldover experiment was planned, and the experimenter elected to foldover on all factors. Use Minitab (you'll only need Create Factorial Design...) to help you answer the following questions.
  - (a) What is the resolution of the first design?
  - (b) What is the resolution of the combined design?
  - (c) Was the foldover useful in this experiment? Why or why not?

2. A replicated  $2^4$  experiment appears below.

- (a) Based on Minitab's probability plot, which effects are significant? Interpret your results.
- (b) Based on the t-tests computed from MSPE, which effects are significant (use Minitab—do not perform hand calculations)?
- (c) In Minitab, remove all three-way and higher terms from the model by selecting Terms and then selecting to Include terms in the model up through order 2. Recompute t-tests using Adjusted MS for Residual Error rather than MSPE as your estimate of  $\sigma^2$ . How do your results compare with your previous responses?

A	B	C	D	Responses
-1	-1	-1	-1	1.2,1.4,4.8
1	-1	-1	-1	-3.7,-1.9,-3.5
-1	1	-1	-1	-5.7,-5.6,-7.3
1	1	-1	-1	5.6,7.2,4.8
-1	-1	1	-1	2.7,1.2,2.8
1	-1	1	-1	-2.8,-1.3,-.9
-1	1	1	-1	-5.2,-6.6,-7.6
1	1	1	-1	6.0,5.7,6.3
-1	-1	-1	1	3.0,2.2,1.4
1	-1	-1	1	-1.9,-.9,-2.3
-1	1	-1	1	-5.5,-5.8,-6.5
1	1	-1	1	6.4,5.5,5.1
-1	-1	1	1	1.9,1.3,2.7
1	-1	1	1	-2.0,-1.3,-.7
-1	1	1	1	-5.2,-5.7,-6.6
1	1	1	1	5.6,4.0,6.2