

Homework 4

1. A researcher wants to study 4 factors in 8 runs with 10 center points. The design appears below.

Factor settings	Response
(-1,-1,-1,-1)	118.6
(1,-1,-1,1)	118.6
(-1,1,-1,1)	159.2
(1,1,-1,-1)	166.4
(-1,-1,1,1)	127.6
(1,-1,1,-1)	129.8
(-1,1,1,-1)	147.9
(1,1,1,1)	170.1
(0,0,0,0)	129.7
(0,0,0,0)	136.9
(0,0,0,0)	123.6
(0,0,0,0)	139.4
(0,0,0,0)	135.2
(0,0,0,0)	127.9
(0,0,0,0)	140.2
(0,0,0,0)	133.2
(0,0,0,0)	113.2
(0,0,0,0)	130.2

- (a) What is s_c^2 ?
 - (b) What is the t critical value for a two-sided .05 test of effects?
 - (c) Run an analysis. Which factor effects are significant?
 - (d) Is there significant curvature?
 - (e) Graduate students should fit a main effects contour plot for the two largest main effects and indicate the direction of steepest ascent.
2. *Violin data.* You have already analyzed the full factorial experiment and one of the half-fractions as part of an in-class exercise. Analyze the remaining half-fraction and compare it to your earlier analyses. The easiest way to set up the design in Minitab is to select the default design for 4 factors in 8 runs. Under Options, unselect Principal Fraction, select Use Fraction and then enter 1 in the dialog box. This will select the fraction I=-ABCD. How similar are results across the three different experiments?