1. A centerpoint design appears below. Part of the output from the Minitab session is attached.

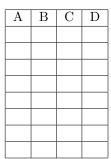| A	B	Response
-1	-1	46
1	-1	37
-1	1	42
1	1	33
0	0	28
0	0	27
0	0	28
0	0	30
0	0	34

(a) Sketch the data on the graph below. Describe the surface.

(b) Using the output, compute T statistics for the A effect, the B effect and the AB interaction.

(c) The t critical value for a $\alpha = .05$ test is 2.776. Which effects are significant? How many degrees of freedom would this test have?

(d) Construct a test statistic for curvature. Is there evidence of curvature? Is this result consistent with the information in the graph in (a)?

2. In all the 2^{4-1} designs we have studied so far (4 factors in 8 runs), we have always aliased D with either ABC or -ABC. Suppose we choose to alias D with AC.

(a) What is the design generator for this design?

(b) List the alias structure for this design. What is the resolution of this design? Discuss.

(c) List the runs for this design in the table below

Runs Table

A	B	C	D

3. An unreplicated experiment for 3 2-level factors produced the factor effects below:

$\bar{y}$	A	B	C	AB	AC	BC	ABC
0.0	5.0	0.6	5.3	-0.9	-4.1	1.3	0.2

(a) Plot the effects on the attached normal plot. Which effects are significant?

(b) Use the negligible effects from (a) to compute $\hat{\sigma}$.

(c) If you wanted to detect an effect size of 1, how many replicates would you need?

(d) If you wanted to minimize the response, what would the EMR be?

Formulas

$$T = \frac{A}{\sqrt{\frac{\hat{\sigma}^2}{n2^{k-2}}}} \qquad T = \frac{A}{s_c/\sqrt{2^{k-2}}}$$

$$n \geq \frac{\hat{\sigma}^2}{2^{k-4}A^2} \qquad \hat{\sigma} = \sqrt{\frac{n*2^{k-2}}{m} \Sigma E_i^2}$$

$$T = \frac{\bar{y}_c - \bar{y}_F}{s_c\sqrt{\frac{1}{n_c}+\frac{1}{n_F}}}$$