**5.1.** The following output was obtained from a computer program that performed a two-factor ANOVA on a factorial experiment.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Two-way ANOVA: y versus A, B | | | | | |
| Source | DF | SS | MS | F | P |
| A | 1 | ? | 0.0002 | ? | ? |
| B | ? | 180.378 | ? | ? | ? |
| Interaction | 3 | 8.479 | ? | ? | 0.932 |
| Error | 8 | 158.797 | ? |  |  |
| Total | 15 | 347.653 |  |  |  |

1. Fill in the blanks in the ANOVA table. You can use bounds on the *P*-values.

(b) How many levels were used for factor *B*?

1. How many replicates of the experiment were performed?
2. What conclusions would you draw about this experiment?

**5.4.** The yield of a chemical process is being studied. The two most important variables are thought to be the pressure and the temperature. Three levels of each factor are selected, and a factorial experiment with two replicates is performed. The yield data follow:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Pressure |  |
| Temperature | 200 | 215 | 230 |
| 150 | 90.4 | 90.7 | 90.2 |
|  | 90.2 | 90.6 | 90.4 |
| 160 | 90.1 | 90.5 | 89.9 |
|  | 90.3 | 90.6 | 90.1 |
| 170 | 90.5 | 90.8 | 90.4 |
|  | 90.7 | 90.9 | 90.1 |

1. Analyze the data and draw conclusions. Use *α* = 0.05.
2. Prepare appropriate residual plots and comment on the model’s adequacy.
3. Under what conditions would you operate this process?