Supplementary Exercises

Mfr. **8.9** Company researchers conducted an experiment to compare the number of major defectives observed along each of five production lines in which changes were being instituted. They monitored production continuously during the period of changes, and recorded the number of major defectives per day for each line. The data are shown here.

Production Line				
1	2	3	4	5
34	54	75	44	80
44	41	62	43	52
32	38	45	30	41
36	32	10	32	35
51	56	68	55	58

a. Compute $\bar{y}$ and s^2 for each sample. Does there appear to be a problem with nonconstant variances? Use Hartley's test based on $\alpha = .05$.
b. Use a square root transformation on the data and conduct an analysis on the transformed data.
c. Draw your conclusions concerning differences among production lines.

8.10 Do a Kruskal–Wallis test on the data represented in Exercise 8.9. Does this test confirm the conclusions drawn in Exercise 8.9? If the results differ, which analysis do you believe? Use $\alpha = .05$.

Ag. **8.11** The Agricultural Experiment Station of a university tested two different herbicides and their effects on crop yield. From 90 acres set aside for the experiment, the station used herbicide 1 on a random sample of 30 acres, herbicide 2 on a second random sample of 30 acres, and they used the remaining 30 acres as a control. At the end of the growing season, the yields (in bushels per acre) were

	Sample Mean	Sample Standard Deviation	Sample Sizes
Herbicide 1	90.2	6.5	30
Herbicide 2	89.3	7.8	30
Control	85.0	7.4	30

a. Use these data to conduct a one-way analysis of variance to test whether there is a difference in the mean yields. Use $\alpha = .05$.
b. Construct 95% confidence intervals on the mean yields μ_i.
c. Which of the mean yields appear to be different?

Hort. **8.12** Researchers from the Department of Fruit Crops at a university compared four different preservatives to be used in freezing strawberries. The researchers prepared the yield from a strawberry patch for freezing and randomly divided it into four equal groups. Within each group they treated the strawberries with the appropriate preservative and packaged them into eight small plastic bags for freezing at 0°C. The bags in group I served newly

developed preservatives. After all 32 bags of straw
at 0°C for a period of 6 months. At the end of t
allowed to thaw and then rated on a scale of 1 t
a low score indicates little discoloration.) The rat

Group I	10	8	7.5	8	9.5
Group II	6	7.5	8	7	6.5
Group III	3	5.5	4	4.5	3
Group IV	2	1	2.5	3	4

a. Use the following plots of the residuals a
to assess whether the conditions neede
with this data set.
b. Test whether there is a difference in th
c. Place 95% confidence intervals on the m
d. Confirm your results with the computer

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                One-Way Analysis of Variance

Analysis of Variance for Ratings
Source      DF        SS        MS        F
Group        3   159.187    53.062    55.67
Error       28    26.687     0.953
Total       31   185.875

                                        Individu
                                        Based on
Group       N      Mean     StDev  --+-----
I           8    8.3125    1.0670
II          8    6.4375    1.0155
III         8    4.0000    0.8452
IV          8    2.5000    0.9636   (---*--
                                    --+-----
Pooled StDev =   0.9763              2.0
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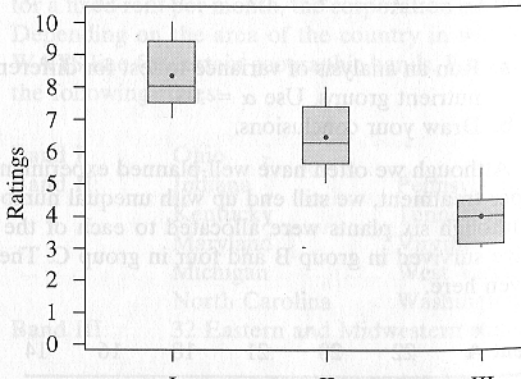

Boxplots of ratings by group for Exercise 8.12 (means are indicated by solid circles)