

Mid-Quarter Review Problems

- When you enter your password while logging onto a computer, suppose there is a 1% chance that you will mis-type your password.
 - In five tries, what is the probability that you will correctly enter your password all five times?
 - In five tries, what is the probability that you will correctly enter your password exactly four times?
- A local artist sells an average of 20 prints in a month, with a standard deviation of 6 prints.
 - Explain, using language the artist could understand, what it means to have a standard deviation of 6 prints.
 - What is the probability this artist sells more than 250 prints in a year? (You may want to convert this to a monthly average before computing the probability.)
- When cooking a whole chicken in the microwave, you are supposed to cook it until the inner temperature reaches 180°F. A 2^3 experiment was run using 7 pound (-) and 9 pound (+) birds, at medium power (-) and high power (+), and with the birds breast side down (-) or up (+). Three replications were done at each factor combination, yielding the following cooking time (in minutes) data summaries:

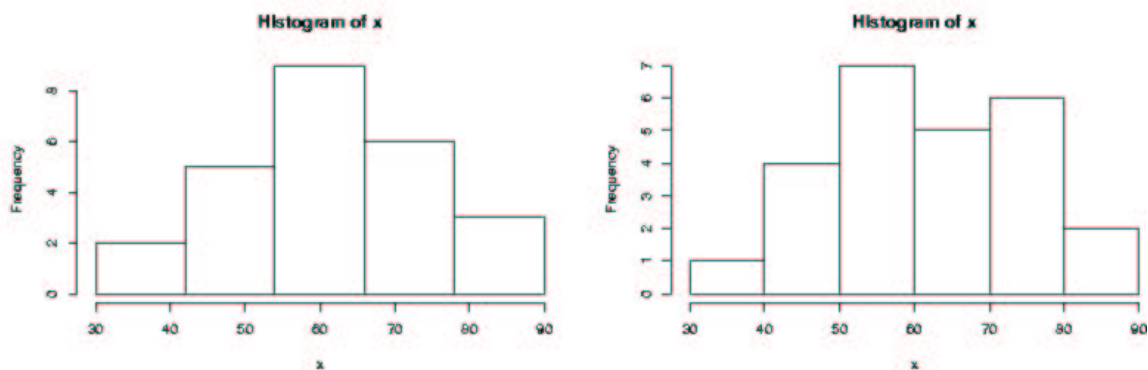
$$\begin{aligned}\bar{Y}_{...} &= 49.1 \\ \bar{Y}_{+..} &= 58.0 \\ \bar{Y}_{.-.} &= 39.6 \\ \bar{Y}_{+..} &= 44.7 \\ \bar{Y}_{.-.} &= 48.2 \\ \bar{Y}_{+..} &= 56.1 \\ \bar{Y}_{.-.} &= 38.8 \\ \bar{Y}_{+++} &= 43.8\end{aligned}$$

The pooled standard deviation was 1.9 minutes.

- What is the main effect due to the power setting?
- What is the standard error of an effect?
- Is the effect due to power significant?

4. How far can a typical UCSC student kick a football? We gathered 16 random students and had each kick a football. The average kick distance was 24 yards with a standard deviation of 9.4 yards. Find a 95% confidence interval for the true mean distance.

5. These are two histograms of the same dataset:



- (a) Explain how these histograms could look different even though they are of the same dataset.
- (b) Describe this dataset.
6. A random sample of 143 Porter students found that 9 of them had tongue piercings.
- (a) Use the six-step method to test the claim that 8% of all Porter students have pierced tongues.
- (b) Find the p -value for this test.
- (c) What does this p -value mean?

7. Regression models are often used to help determine the appraised value of single-family houses. This dataset involves houses from a suburban New York community. Available variables for prediction are lot size, number of bedrooms, number of bathrooms, age of the house, and whether it has central air conditioning. Use the regression output and plots (next page) that follow to answer these questions:
- Is there a relationship between appraised value and the five explanatory variables?
 - Interpret the R^2 in the context of the problem.
 - Are there any apparent problems with the assumptions?
 - If you had access to a computer with a statistical package, what would be your next step? Using the available information, what model do you think will be the best model to use?
 - For your final model from part (e), how many degrees of freedom will its residual standard error have? (Recall that this is the same number of degrees of freedom that you would use for the tests of significance of the coefficients.)

Call:

```
lm(formula = Value ~ Lotsize + Bed + Bath + Age + CAC)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-51.016	-14.029	-2.909	12.008	89.179

Coefficients:

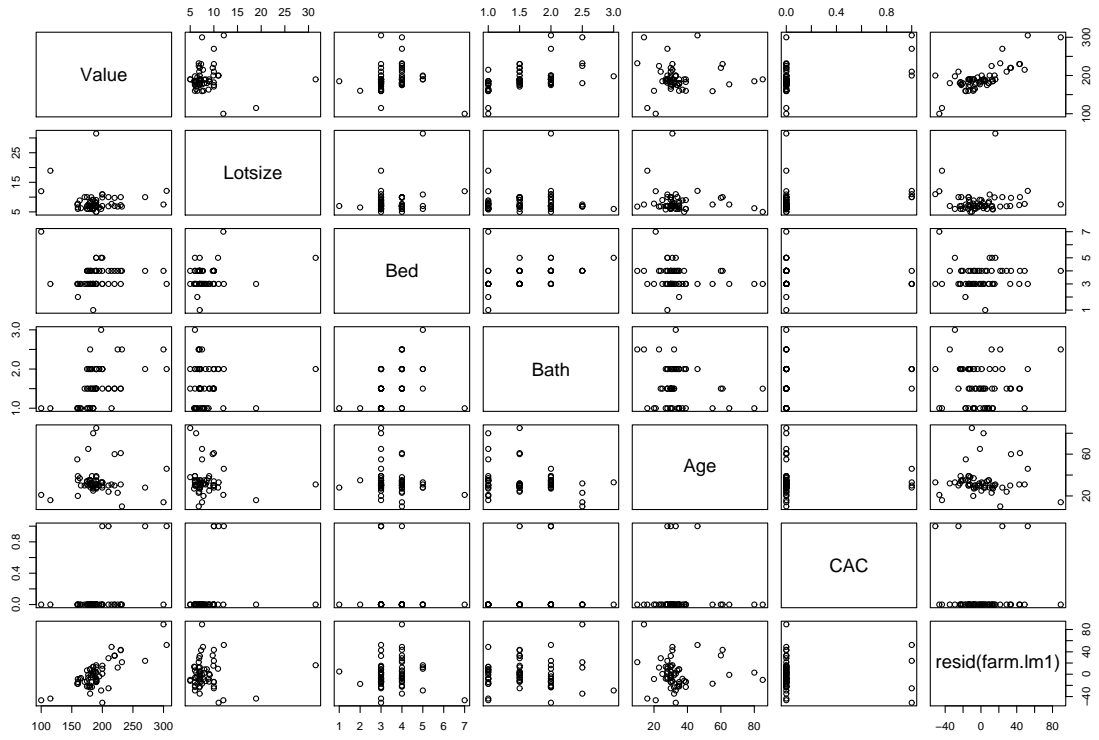
	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	153.0023	21.0526	7.268	1.51e-09	***
Lotsize	-0.8226	0.9590	-0.858	0.394849	
Bed	-4.6830	4.4999	-1.041	0.302666	
Bath	31.8970	7.6369	4.177	0.000109	***
Age	0.2055	0.2660	0.773	0.443135	
CAC	50.4346	14.1393	3.567	0.000766	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 26.06 on 54 degrees of freedom

Multiple R-Squared: 0.415, Adjusted R-squared: 0.3608

F-statistic: 7.662 on 5 and 54 DF, p-value: 1.68e-05



Normal Q-Q Plot of Residuals

