

Solutions to Exam #2

Math 114-B

Wednesday, October 29, 1997

1. The population proportion is $\theta = 0.6$. The standard deviation is $\sqrt{\frac{0.6(1-0.6)}{200}} = 0.03464$. Standardizing, we have $\frac{0.65-0.6}{0.03464} = 1.44$. $\Pr(\hat{p} > .65) = \Pr(Z > 1.44) = 0.075$.
2. If the residuals form a pattern, then there is some significant factor missing from the regression model. This factor needs to be identified and included in the model.
3. Fitted values are the outputs (y 's) from putting sample data's independent variables (x 's) into the regression formula. The residuals are the differences between the sample data's dependent variables (y 's) and the fitted values.
4.
 - (a) $\frac{25}{40} = 62.5\%$
 - (b) $\frac{25}{1835} = 1.36\%$
5. There should be three bars, each rising to 100%. The Math bar should be split into 38%/62%, the CS bar should be split into 50%/50%, and the Other bar should be split into 44%/56%. The first percentage is the "From NC" percentage, the second the "From Outside of NC" percentage.
6. The population is the set of all voters. The parameter is the population proportion, 43%, denoted by θ . The sample is the set of voters who call in. The statistic is the sample proportion, 5%, denoted by \hat{p} .
7. Three examples of sampling bias, with two being from class. Examples from class include the Literary Digest poll on the 1936 presidential election, the Shere Hite sample on women's attitudes to relationships, and the phone-in poll as to whether or not Elvis is alive. A small sample size does not constitute sample bias.
8. An outlier will have a disproportionate affect on a regression line, i.e., if the outlier is deleted the line will change significantly. A possible example from class is the one involving longevity versus gestation time in animals.

9. The regression equation is $y = 0.505x - 2.208$, and the proportion of variability explained by the model is $r^2 = 0.9944$.
10. This problem refers to Activity 13-6, which we discussed in class.
- (a) The plot is a parabola.
 - (b) The standard deviation is largest when $\theta = 0.5$.
 - (c) The standard deviation is smallest, i.e., is 0, when $\theta = 0$ or 1.