

Practice Quiz 11

Statistics 200

Fall 2007

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1. (5 pts.) Some shoppers were observed in supermarket bakery departments that provided tongs and others were observed in departments that provided tissues. A researcher recorded how many people used their hands to withdraw baked goods instead of the tongs or tissues provided:

	Hands	No Hands	Total
Tongs	97	11	108
Tissues	83	49	132
Total	180	60	240

- (a) Which *two* of these is a correct formulation of the null hypothesis?
- Use of hands, and whether tongs or tissues are provided, are not related.
 - Use of hands, and whether tongs or tissues are provided, are related.
 - Proportions who use their hands are the same for all shoppers in stores that provide tongs and stores that provide tissues.
 - Proportions who use their hands are different for all shoppers in stores that provide tongs and stores that provide tissues.
- (b) Explain how the study's results may be biased if observations were made in the morning for stores with tongs and in the evening for stores with tissues.
- (c) Explain how the study's results may be biased if stores with tongs tended to be located in areas with a large student population.
- (d) If proportions using their hands were actually equal for shoppers in stores providing tongs and tissues, then the proportions would both be _____.
- (e) Complete this table of counts expected under the null hypothesis.

	Hands	No Hands	Total
Tongs			108
Tissues			132
Total	180	60	240

- (f) Calculate the chi-square statistic; its size is
(i) large (ii) not large (iii) borderline
- (g) The p-value is (i) small (ii) not small (iii) borderline
- (h) Draw your conclusions, first in terms of a relationship, then in terms of population proportions using their hands.

2. (5 pts.) Salary (in millions) was regressed on batting average for a sample of 6 baseball players in 2004.

The regression equation is

$$\text{Salary} = -28.9 + 122 \text{ BattingAverage}$$

Predictor	Coef	SE Coef	T	P
Constant	-28.947	8.700	-3.33	0.029
BattingA	121.55	30.32	4.01	0.016

S = 1.574 R-Sq = 80.1% R-Sq(adj) = 75.1%

- (a) Explain why it makes sense for the relationship to be positive.
- (b) The p-value and the value of R-Sq together tell us that there is
- weak evidence of a weak relationship between batting average and salary
 - weak evidence of a strong relationship between batting average and salary
 - strong evidence of a weak relationship between batting average and salary
 - strong evidence of a strong relationship between batting average and salary
- (c) We seek evidence regarding the slope of the regression line for the
- sample of 6 players
 - population of all players
- (d) Inference for regression leads us to conclude that the slope
- may equal zero
 - equals zero
 - does not equal zero
- (e) Would a confidence interval for the slope contain zero? (Answer yes or no.)
- (f) Output is shown when interval estimates are requested for a batting average of .3. Which interval estimates the mean salary of all players whose batting average is .3?

New Obs	Fit	SE Fit	95.0% CI	95.0% PI
1	7.518	0.767	(5.387, 9.648)	(2.656, 12.379)

Values of Predictors for New Observations

New Obs	BattingA
1	0.300

- (g) One particular player with a batting average of .3 earned a salary of 4.917 million. Based on the appropriate interval, is this surprisingly low, or is it “in the right ballpark”?