

Ch 15: Inference for Regression Part II

EQ: How do you spot a *meaningless* regression analysis?

➤ Hypotheses for Inference for Regression:

$H_0$ : there \_\_\_\_\_ between \_\_\_\_\_ and \_\_\_\_\_

$H_a$ : there \_\_\_\_\_ between \_\_\_\_\_ and \_\_\_\_\_

$H_0$ : \_\_\_\_\_

$H_a$ : \_\_\_\_\_ or \_\_\_\_\_ or \_\_\_\_\_ NOTE: You will have to decide \_\_\_\_\_.

Ex. 1 Data on Crying Babies

$H_0$ : \_\_\_\_\_

$H_a$ : \_\_\_\_\_

\*\*\* \_\_\_\_\_

Regression Analysis

The regression equation is

$IQ = 91.3 + 1.49 \text{ Crycount}$

Predictor	Coef	StDev	T	P
Constant	91.268	8.934	10.22	0.000
Crycount	1.4929	0.4870	3.07	0.004

$S = 17.50$

estimates  $\sigma$

R-Sq = 20.7%

$SE_b$

We usually ignore this part.

BE CAREFUL: Sometimes \_\_\_\_\_

$P(t \text{ _____}) = \text{_____}$

Since our p-value of \_\_\_\_\_ is \_\_\_\_\_ than our significance level \_\_\_\_\_, we have evidence to \_\_\_\_\_ the null. We \_\_\_\_\_ to think it's plausible that \_\_\_\_\_

Based on this conclusion from the hypothesis test, what values would you expect to be found in a 95% confidence interval?

What about the confidence interval could help you decide on a possible **direction** for the linear relationship?

➤ Do p. 904 #7 You should have this data in your calc as **BEER** and **BAC**. If not, input the data.

Calculate and state the LSRL for this data.

\_\_\_\_\_

We want to test the claim "the \_\_\_\_\_ has \_\_\_\_\_ on \_\_\_\_\_ vs the \_\_\_\_\_ increases \_\_\_\_\_".

**State:**  $H_0$ : \_\_\_\_\_

$H_0$ : \_\_\_\_\_

$H_a$ : \_\_\_\_\_

$H_a$ : \_\_\_\_\_

**Plan:** Method of Inference: \_\_\_\_\_

Parameter of Interest: \_\_\_\_\_

**Conditions:** (Usually states "Assume the conditions have been met". **Acknowledge** them.)

1. Independence: \_\_\_\_\_ Subjects?
2. Straight-Line Association: Check \_\_\_\_\_ plot
3. Standard deviation same for all values of  $x$ : Check \_\_\_\_\_ plot for consistency
4. Normal: Make \_\_\_\_\_ of \_\_\_\_\_ and check for \_\_\_\_\_ or \_\_\_\_\_.

**Do:** Calculations: [We are going to run another **TEST** on the calculator. 😊 ]

- STAT → TESTS → **LinRegTTest**

Xlist:  $L_1$

Ylist:  $L_2$

Freq: 1

$\beta$ :  $\neq 0$   $< 0$   $> 0$  \*\*\*Choose based on alt hyp

RegEQ: [leave blank]

Calculate

What information is obtained from this function?

[LABEL AND INCLUDE THESE VALUES WITH YOUR WORK.]

$t =$  \_\_\_\_\_  $p\text{-value} =$  \_\_\_\_\_  $df =$  \_\_\_\_\_  $a =$  \_\_\_\_\_  $b =$  \_\_\_\_\_

$s =$  \_\_\_\_\_  $r^2 =$  \_\_\_\_\_  $r =$  \_\_\_\_\_  $\alpha =$  \_\_\_\_\_

How can you determine  $SE_b$ ? \_\_\_\_\_  $P(t \text{ _____}) =$  \_\_\_\_\_

Interpretation:

Since our p-value of \_\_\_\_\_ is \_\_\_\_\_ than our significance level,  $\alpha =$  \_\_\_\_\_, we have significant evidence to \_\_\_\_\_ the null. It is plausible that \_\_\_\_\_

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➤ In Class p. 908 #11 a) \_\_\_\_\_

b)  $t\text{-statistic} =$  \_\_\_\_\_

c) Given  $n = 5$ , then  $df =$  \_\_\_\_\_ ? Use the t-distribution function to calculate a p-value.

d) Interpret your p-value in context of the problem: \_\_\_\_\_

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e) Calculate and interpret a 99% confidence interval. \_\_\_\_\_

[Interpret: REMEMBER YOU ARE CREATING A CONFIDENCE INTERVAL TO ESTIMATE SLOPE.]

We are \_\_\_\_\_ confident that, on average, for each additional \_\_\_\_\_ in \_\_\_\_\_, the predicted \_\_\_\_\_ will \_\_\_\_\_ between \_\_\_\_\_ and \_\_\_\_\_.

#12 a)

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b) \_\_\_\_\_  
\_\_\_\_\_

Calculate and interpret a 99% confidence interval. \_\_\_\_\_

We are \_\_\_\_\_ confident that, on average, for each additional \_\_\_\_\_ per  
\_\_\_\_\_ of running speed, the predicted steps per second will \_\_\_\_\_  
between \_\_\_\_\_ and \_\_\_\_\_.

[You may need to discuss what the interval captures and what that means in terms of question asked.]

➤ Assignment p. 908 - 909 #13, 15

Ladies and Gentlemen, Elvis has left the building!!

Peace Out!!!

