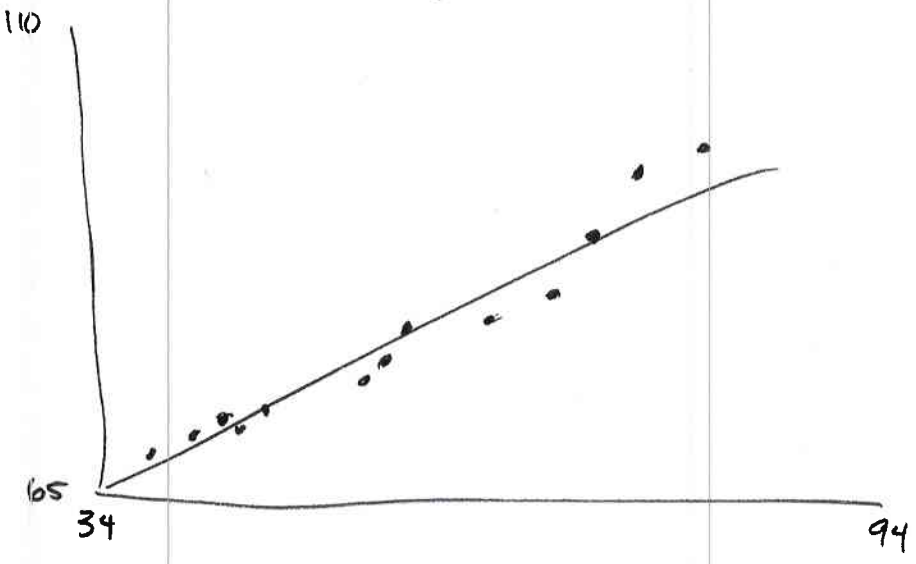
Stat 2470, Quiz #13, Spring 2015 Name KEY

Instructions: Show all work. State any formulas used. If you use the calculator, you should say which function you used, and what you entered into it, as well as any output. I can only give partial correct for incorrect answers if I have something to grade.

1. Use the data to find a linear regression model. Plot the data on a scatterplot along with the regression equation. State the correlation for the model.

x	39	40	45	47	50	53	62	63	65	73	73	78	80	82	89
y	71	71	73	74	75	76	78	80	84	85	85	88	93	101	104

$y = .6039x + 44.726$



$r = .9458$

2. What proportion of the change in y is explained by the relationship with x?

89% (r^2)

3. Test the hypothesis that the correlation is non-zero for this model. Clearly state your hypotheses and conclusions.

LinRegTTest

$H_0: \rho = 0$
$H_a: \rho \neq 0$

XList: L5
YList: L6

$\Rightarrow t = 10.50$
$p = 1.015 \times 10^{-7} < .05$
reject H_0

4. Find the 95% confidence interval for β_1.

LinRegTInt
XList: L5
YList: L6
C-level: .95

$\Rightarrow (.47972, .72818)$

5. Create a prediction interval for $\hat{y}$ at $x^* = 70$. 95%

$S = 3.50$ $n = 15$ $df = 13$ $t_{\alpha/2} = 2.16$

$$\hat{y} \pm t_{\alpha/2, n-2} \cdot s \sqrt{1 + \frac{1}{n} + \frac{(x^* - \bar{x})}{S_{xx}}}$$

$\hat{y} = .6039(70) + 44.726$

$= 86.999$

1 Var Stats L5

$\bar{x} = 62.6$

$S_x = 16.27355$

$(S_x)^2(n-1) = S_{xx}$

$= 3707.598$

$$86.999 \pm 2.16 \cdot 3.50 \sqrt{1 + \frac{1}{15} + \frac{(54.76)}{3707.598}}$$

86.999 ± 7.8618

$(79.1372, 94.8608)$