*YOUR TA’S NAME*:

*Lecture Worksheet*

*Thursday 11/5/2020*

**MAIN POINTS OF LECTURE**

1. Assumptions that must hold for hypothesis tests to be valid
   1. The functional form of the relationship between X and Y is appropriately specified; usually this means checking for linearity
   2. There are no extreme outliers
   3. The variability of the prediction errors is constant across the observed values of X (assumption of homoskedasticity)
   4. The values ofY are normally distributed at each value of X (assumption of normality)
   5. The observations are independent
2. Hypothesis Tests About 2YX
   1. R2YX is a sample estimate of population parameter 2YX
   2. If 2YX equals zero, then X does nothing to explain variability in Y
   3. This is a one-sided test because 2YX cannot possibly be less than zero
   4. Critical value is F with dfNUM=1 and dfDENOM=N—2
   5. Test statistic is 
3. Hypothesis Tests About YX
   1. rYX is a sample estimate of population parameter YX
   2. If YX equals zero, then there is no correlation between X and Y
   3. The critical value is a Z score
   4. Test statistic is where 
4. Hypothesis Tests About Slope YX
   1. bYX is a sample estimate of population parameter YX
   2. If YX equals zero, then the regression of Y on X has a zero slope
   3. Critical value is t with n-2 degrees of freedom
   4. Test statistic is 
5. Confidence Intervals for Slope YX
   1. where t\* is a t value with n-1 degrees of freedom

**QUESTIONS**

Mean of X: 6.50 SD of X: 2.95

Mean of Y: 7.15 SD of Y: 1.46

rXY: 0.51 n: 20

1. [From the recorded lecture] Test the hypothesis that 2YX --- the population proportion of variation in Y explained by X --- is zero in the population; use =0.05

With dfNUM=1 and dfDENOM=N-2=18 and =0.05, the critical value F\*=4.41

To compute the F statistic, we need:

= (1.462)(19) = 40.5

= (0.512)(40.5) = 10.53

= 40.5-10.53 = 29.97

Since F exceeds the critical value F\*, we reject the null hypothesis.

1. [From the recorded lecture] Test the hypothesis that YX --- the population correlation between X and Y --- is zero in the population; use =0.05

With =0.05 for this two-sided test, the critical value Z\*=1.96

Since Z exceeds the critical value Z\*, we reject the null hypothesis

1. [From the recorded lecture] Test the hypothesis that YX --- the population slope relating Y to X --- is zero in the population; use =0.05

With =0.05 for this two-sided test, the critical value t\* with df=N-2=18 is 2.101

Since t exceeds the critical value t\*, we reject the null hypothesis

1. [From the recorded lecture] Construct a 95% confidence interval for YX --- the population slope relating Y to X

where t\* is a t value with n-2 degrees of freedom. So in this case, t\*=2.101

So, .

This, the 95% confidence interval ranges from 0.041 to 0.463.