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Statistical Analysis Homework TAKE TWO—Econ 4810—Senior Seminar--Dickinson

Task 1

Average Monthly Temperatures (degrees Fahrenheit)			
Month	**Honolulu, Hawaii**	**Miami, Florida**	**Boone, North Carolina**
January	74.4	67.5	32.0
February	72.6	68.0	34.0
March	73.3	71.3	41.0
April	74.7	74.9	49.0
May	76.2	78.0	58.0
June	78.0	80.9	65.0
July	79.1	82.2	69.0
August	79.8	82.7	68.0
September	79.5	81.6	61.0
October	78.4	77.8	52.0
November	76.1	72.3	43.0
December	73.7	68.5	35.0
Paired sample t-tests Miami vs. Honolulu. T-stat= -0.82. 2-tailed critical t-stat for a 5% test is 2.20. Paired sample t-tests Miami vs. Boone. T-stat= 10.93. 1-tailed critical t-stat for a 5% test is 1.80.			

The results of the first two-sided t-test is that we fail to reject the null hypothesis that Miami and Honolulu have equal average monthly temperatures. The p-value is .43, meaning there is a 43% chance that the observed differences are due to chance alone. For the test of Miami vs. Boone, we reject the null hypothesis that average monthly temperatures are equal. Because this is a one-sided test, we therefore conclude that average monthly temperatures are higher in Miami than Boone (if it were a two-sided test, we would conclude that temperature are simply "different"). The p-value for this one-sided test is .00 (rounded), indicating that there is basically zero chance that these monthly temperature differences would occur by chance alone, as opposed to resulting from actual different temperature distributions.

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Task 2

PREDICTORS OF ANNUAL NET SALES

(dep variable=Annual Net Sales in $ thousands)

Variable	Coefficient (standard error)
Intercept	-18.86 (30.15)
Square Feet (thousands)	16.20 (3.54)***
Inventory ($ thousands)	.17 (.06)***
Spending on Advertising ($ thousands)	11.53 (2.53)***
Size of Sales District (thousands of families)	13.58 (1.77)***
# of Competing Stores	-5.31 (1.71)***
R-squared	.99

*,**,*** indicate significance at the .10, .05, and .01 levels, respectively, for 2-tailed test.

Each of the significant coefficients indicates the effect of a one unit change in that variable on the dependent variable. All of the following results are statistically significant at the .01 (p-value) level. Increasing your store size, your inventory, your advertising spending, and your sales district are all predicted to increase annual net sales. In contrast, an increase in the number of competing stores will decrease your annual net sales. These variables together explain most all of the variation in annual net sales (i.e., very high R^2=.99)

More specifically, our model predicts that increasing the size of your store by 1000 sq ft will increase annual net sales by $16,200. Increasing the value of your inventory by $1000 increases your annual sales by just $170 (it is statistically quite significant, but the magnitude of the effect is modest). Spending an additional $1000 on annual advertising increases annual sales by $11,530. We also find that an increase in the size of one's sales district of 1000 families will increase annual sales by $13,580. And finally, each additional competitor store in your district will reduce your annual sales by $5,310.