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2/11
MA 331 HW 2
"I pledge my honor that I have abided by the Stevens Honor System" - Himanshu Rana

1) a) range of X: $94.1 - 25.8 = 68.3$
variance of X: $\frac{1}{n-1}\sum_{i=1}^{n}(x_i-\bar{x})^2 = 683.1$
range of Y: $18.2 - 9.7 = 8.5$
variance of Y: $\frac{1}{n-1}\sum_{i=1}^{n}(y_i-\bar{y})^2 = 9.0$

b) The spread of the two variables are not equivalent. Variable X has more of the numbers bunched together towards the right while Y is more to the left.

c) $$r = \frac{\sum_{i=1}^{n}(x_i-\bar{x})(y_i-\bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i-\bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i-\bar{y})^2}} = \boxed{0.966}$$

The value is sufficent to conclude linearity as the number is very close to 1 making it a strong relation

2) A: .3 B: 0 C: -1 D: -.6

3) Billy's predictions will probably lean more towards candidate B winning because he is sampling more from rural areas where B is more popular. However, this is not reflective of the city as a whole where most people live in urban areas and candidate A is more popular amongst that group. To minimize sampling bias, Billy should sample in proportion to the percantage of people living in urban and rural areas to accurately represent the city.