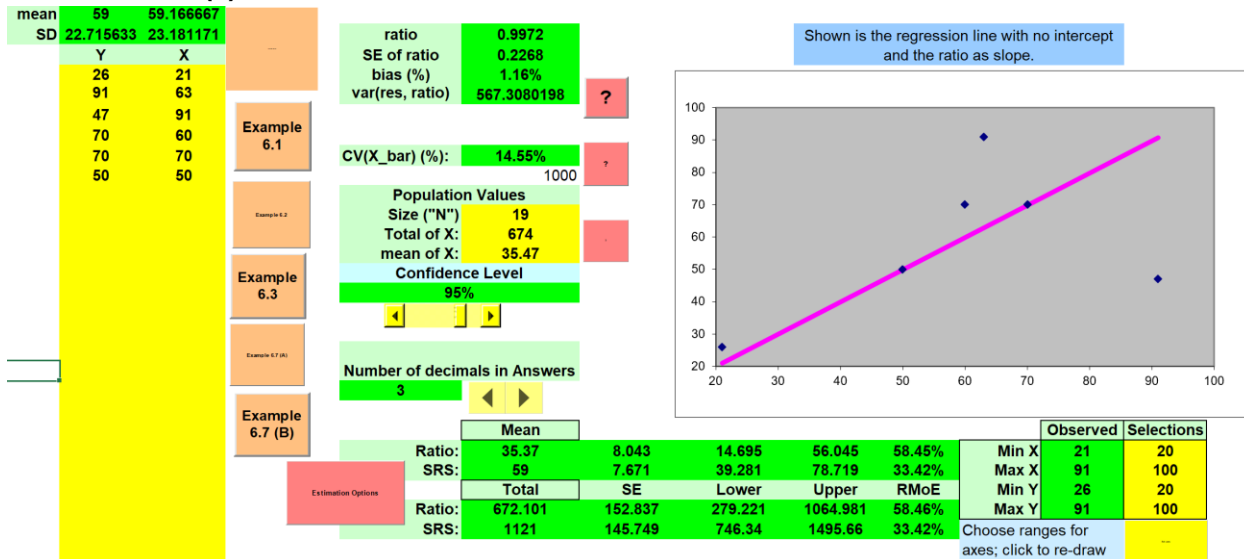


STAT 4155 Homework 3

1. SMOG 6.23 (a)



Estimator of Population Ratio:

$$r = \frac{y}{x} = \frac{59}{59.167} = 0.9972$$

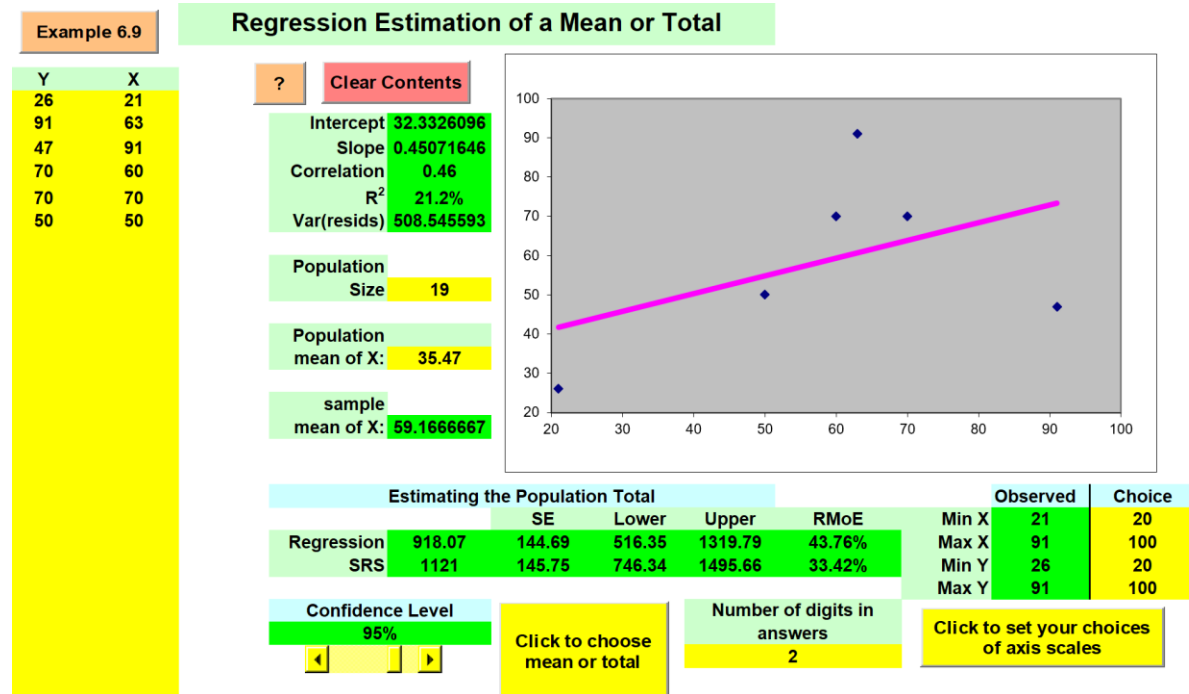
Ratio Estimator of 1989 Total Income:

$$\hat{t}_y = r\tau_x = 0.9972 \cdot 674 = 672.1$$

Place a Bound on The Error of Estimation:

$$672.1 \pm 392.88$$

2. SMOG 6.23 (b)



Regression Estimator of 1989 Total Income:

$$\hat{t}_{yL} = 918.07$$

Place a Bound on The Error of Estimation:

$$918.07 \pm 401.72$$

1.

Estimating means and totals from stratified samples					Confidence Intervals		Relative margin of error			
Strata Summary:					Estimate	SD(Est)	lower limit	upper limit		
No.	Stratum Size	Sample Size	Sample Mean	Sample SD	mean:					
1	400	98	24.1	74.6659	total:	54496.6	5840.01	42946.08	66047.12	
2	30	10	25.6	63.7495					21.18%	
3	61	37	267.6	589.5388						
4	18	6	179	150.99						
5	70	39	293.70	351.5366						
6	120	21	33.20	98.9697						
7										
8										
9										
10										
11										
12										
13										
14										
15										
totals:		699	211							

d.f. selector	Satterthwaite	confidence level	t-multiplier
134.31	95%	1.98	

Ex. 5.2/5.3	Ex. 11.7a	2
Ex. 5.17	Ex. 11.7b	Number of decimals in answers
Case Study	Ex. 11.8	

Estimate	SD(Est)	Margin of error	Relative margin of error
mean: 77.96	15.9400	31.53	40.44%
d.f. 210	t-multiplier 1.98		

Comparing Two Stratum Means			
Strata to Compare	Estimate	SD(Est)	Confidence Intervals
First			lower limit
Second			upper limit
			d.f. t-multiplier

Estimated Population Total Number of Caribou:

Table 2 $X = 54,452$, Excel $X = 54,496.6$

Table 2 95% CI for X : (42585, 66319), Excel 95% CI for X : (42946.08, 66047.12)

3.

My first impression was to agree that the paper did do a census of the caribou population but after further consideration I disagree and feel that the paper does not do a census of the caribou population. I believe this to be the case because a census means to count a population and get a total. When I think of stratified random sampling I think of using a population to sample about a specific question where the population is already known. In the case of a census the population cannot be known and is actually the goal that is trying to be achieved and therefore disagree that the research team did an official census.

4.

- a) The article describes proportion allocation as, "the sampling fraction is the same in each of the strata." This lacks clarity and should state the following: because sample sizes n_1, n_2, \dots, n_L are proportional to stratum size N_1, N_2, \dots, N_L . Of course, proportional allocation can be, and often is, used when stratum variance and costs are not equal. One advantage to using this allocation is that the estimator Y_{st} becomes simply the sample mean for the entire sample.

- b)** In the first paragraph of page 395 it explains what they think stratified random sampling to be but to clarify, in order for it to be stratified random sampling they must select a simple random sample from each stratum once the strata's have been set. In this it never mentions making a simple random sample in each strata.