## **B.** Exercises

You should be prepared to present the exercises and at least an attempt to solve them. A complete solution is not required but you should at least have read, understood and attempted to solve them before going to the lecture.

## For February 13, 2012

14. A population has been divided into two parts. A person has drawn a systematic  $\pi$ pssample with 82 units in the first larger part/stratum which contains 1712 elements. The second stratum is a "take all stratum" where all elements are selected. The mean value of the 82 yi/ $\pi$ ivalues is 675 and their sample standard deviation is 120. The mean value of the 18 observations from the "take all stratum" is 1550 and the sample standard deviation there is 900.

- a) Describe how to take a systematic  $\pi$ ps-sample.
- b) Estimate the total in the full population.

c) Estimate the standard deviation of the estimate of the total. You are allowed to make any assumptions that you need but you should make them explicitly and motivate them.

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10	15	78	2	98	35
27	22	47	35	102	4
5	7	12	66	190	34
23	17	22	24	56	13
9	12	7	32	41	19
21	17	415	47	70	24
11	4	12	16	23	87
12	67	13	21	8	18
83	38				

15. A population with 50 units has the following auxiliary variables

Construct a Pareto- $\pi$ ps-sample of size 10.

16. In a market study a simple random sample of 1000 grown up Swedes (between 18 and 74 years old) were asked among other things whether they know what "Blocket" is and if they have access to a computer in their home.

Data	Recogr	nizes "Blocket"	
Computer	Yes	No	Total
Yes	592	298	890
No	22	88	110
Total	614	386	1000

- a) Estimate the proportion of Swedes who recognizes "Blocket" och ange medelfelet and state the standard error.
- b) From other surveys it is known that exactly 91,2 % has access to a computer. Use this to obtain a better estimate and its standard error
- c) Data from the survey which can be divided after age into two age classes.

<u>&lt;</u> 49 years	Recognizes "Blocket"			<u>≥</u> 50 y	$\geq$ 50 y Recognizes "Blocket"			
Computer	Yes	Noj	Sum	Computer	· Yes	No	Sum	
Yes	355	155	510	Yes	237	143	380	
No	15	25	40	No	7	63	70	
Sum	370	180	550	Sum 2	244	206	450	

The proportion in the older age group in the population is 42,1 %. How can this information be used in order to improve the estimate even further. Give the estimate.