

EPRS853

Review for Summation (Σ)

A Basic Exercise

The summation (Σ) operation is crucial in statistics. It is essential that you understand it so that you can calculate various statistics and also understand various formulas which contain the summation. The following is a basic exercise for you to practice the summation (Σ) operation. It would be extremely difficult for you to continue this class if you do not digest this concept at this point.

Note: Again, this is a basic operation upon which various statistical concepts are built. Therefore, understanding the summation (Σ) operation is a necessary but not a sufficient condition for you to do well in this class (e.g., exams) or for you to become a competent researcher.

Suppose a student is interested in finding out the number of hours your friends spend in exercising and the number of hours they spend watching TV per week.

Name	Exercise (hrs/wk) X	TV (hrs/wk) Y
Mary	10	0
Joe	0	9
Kathy	0	6
Alex	3	3
Linda	2	2

$$\bar{X} = \sum \frac{X_i}{N}$$

Use the formulas:

1. Calculate (a) mode (b) median (c) mean (d) range (e) variance and (f) standard deviation for **the exercise hours**. Show work. (The answers and work are shown here for an example.)

$$s^2 = \frac{\sum (X_i - \bar{X})^2}{N}$$

x	$X - \bar{X}$	$(X - \bar{X})^2$
10	7	49
0	-3	9
0	-3	9
3	0	0
2	-1	1

$\Sigma X = 15$ $\Sigma (X - \bar{X}) = 0$ $\Sigma (X - \bar{X})^2 = 68$
 (Always 0

(a) The most frequently occurred number was 0. Thus the mode is 0.

(b) The five numbers from least to most is 0 0 2 3 10. The middle number is 2. Therefore, the median is 2.

(c) $\Sigma X/N = 15/5 = 3$. Thus, the mean is 3.

(d) Range = Highest score - lowest score = $10 - 0 = 10$

(e) Variance = $(X - \bar{X})^2 / N = 68/5 = 13.6$

(f) SD is the square root of 13.6. It is 3.69. (Use the calculator here! You do need a calculator with %&)

2. Calculate (a) mode (b) median (c) mean (d) range (e) variance and (f) standard deviation for **the TV hours**. Show work.

3. Calculate the correlation coefficient (r) for X and Y. Interpret the results. See the text for the computational formula. You will see a lot of Σ s in the formula. Show work.

Note: After you calculated everything by hand, you may want to check your answers by using a computer program. You can use SPSS, QCC (Quick Correlation Calculator), etc. QCC is available for downloading at www.gsu.edu/~epstco. QCC will give you not only the correlation coefficient but other descriptive statistics. Using QCC, the whole process above will take less than a minute. Worth a try!