

Review of Mathematical Techniques

This is a quick review of some mathematical techniques that you will need to remember for the work in Chapters 3, 4, and beyond...

You may remember, “Please Excuse My Dear Aunt Sally” as a mnemonic device to help remember the order of operations for which calculations have priority: **P**arentheses, **E**xponents, **M**ultiplication, **D**ivision, **A**ddition, **S**ubtraction!

What do you do when you see:

1. A letter or symbol that needs to be a number?
 - a. f
 - b. N
 - c. K
 - d. X
2. Two numbers next to each other?
 - a. NK
 - b. Xf
3. Parentheses around an equation?
 - a. (NK)
 - b. (Xf)
4. Are (NK) and NK different or the same?
5. A small and raised up “2” after a number?
 - a. 4^2
6. What if this superscript ² is after a letter?
 - a. X^2
7. What if this superscript ² is after something in parentheses?
 - a. $(X)^2$
8. Are X^2 and $(X)^2$ different or the same?
9. The sigma or funny capital “E” or Σ
10. Sigma is in front of a letter?
 - a. ΣX
11. Sigma is in front of two letters?
 - a. ΣXf
12. Sigma is in front of an equation inside parentheses?
 - a. $\Sigma(Xf)$
 - b. $\Sigma(X-\bar{X})$
13. Are $\Sigma(Xf)$ and ΣXf different or the same?
14. Sigma & parentheses and there is a superscript ² at the end of the parentheses?
 - a. $\Sigma(X)^2$
15. Are $\Sigma(X-\bar{X})^2$ and $\Sigma(X-\bar{X}^2)$ different or the same?

Answers: (1) Find the relevant number and replace the letter/symbol with the number! (2) Multiply. (3) Do whatever is called for within those parentheses before any operation using the things within the parentheses (**P** comes first in **PEMDAS**...). (4) The same – multiply N times K. (5) Square it: Multiply the number by itself. (6) Replace the letter with the relevant number and then square it. (7) Square the number that is signified by what’s inside the parentheses. (8) Effectively they are the same – square X. (9) Sum or add up whatever follows this symbol. (10) Add up all the relevant numbers. (11) Summing is a lower priority than Multiplying thus multiply first and then add up all the products. (12) Do the equation inside the parentheses and then add them up. (13) Effectively the same: multiply then add. (14) Inside parentheses is first priority – then square/multiply – then add. (15) Different!