

Épreuve de section européenne

A certain amount of symbolism

Care must be taken by the student to avoid confusing *suffixes* and *indices*. Suffixes are small numbers or letters written after a symbol at the foot, e.g. x_1 , σ_x , etc. ; these are merely descriptive and confine the use of the symbol to a particular purpose. Indices are small numbers written after and above symbols and have their usual algebraic significance ; for example, x^2 (x squared) means x multiplied by x , y^3 (y cubed) means y multiplied by y multiplied by y , and so on.

The usual arithmetic symbols $+$, $-$, \times and \div , have their usual significance. There are two other symbols with which the non-mathematical student may not be familiar. Vertical lines drawn each side a quantity mean ‘the positive numerical value of’, e.g. $|a - b|$ means ‘the positive numerical value of the difference between a and b ’. Using this notation, therefore, it does not matter whether we write $|a - b|$ or $|b - a|$. Secondly, there is the factorial sign, ‘!’. This latter is best explained by examples, e.g. $4!$ stands for $4 \times 3 \times 2 \times 1$, $6!$ for $6 \times 5 \times 4 \times 3 \times 2 \times 1$, and so on.

Adapted from *Statistical Calculation For Beginners*
by E.G. Chambers, Cambridge University Press

Questions

1. Explain in your own words the difference between suffixes and indices. Illustrate it with the following equality $u_3 = u_1 \times q^2$, where u is a numerical sequence of numbers and q is a real number.
2. Read out loud the following equation : $x^2 + x + 2 = y^3$. (Bonus : Can you find an easy couple of solutions to that equation?)
3. What is the “usual significance” of the arithmetic symbols $+$, $-$, \times and \div ?
4. (a) Compute $|5 - 7|$.
(b) Explain the definition of the notation $|x|$ given in the text.
(c) Explain why “Using this notation, [...] it does not matter whether we write $|a - b|$ or $|b - a|$.”
5. (a) Explain in your own words the significance of the notation $n!$, where n is a natural number.
(b) Compute, without a calculator, the number $7!$.
(c) Give a famous formula that uses this symbol.