People's **D**emocratic **R**epublic of
Algeria **M**inistry of **H**igher **E**ducation and
Scientific **R**esearch

UNIVERSITY OF BISKRA

DEPARTMENT OF TECHNOLOGY

MODULE: TECHNICAL ENGLISH

ENGLISH LECTURE REPORT

PRESENTED BY:

DR. A. BOUCETTA

FOR SECOND YEAR STUDENTS
LICENCE TECHNOLOGY

2024-2025

Chapter II:

Uses of numbers, symbols, equations and process measurement

II-1- Math Numbers

a/- Natural numbers

b/- Integers numbers

c/- Rational numbers

d/- Real numbers

e/- complex numbers

II-2- Math symbols

a/- Common Math Symbols

b/- Math Symbols Used in Logic

c/- Geometry and Algebra Symbols

d/- Greek Alphabets and Combinatory Symbol

II-3- Math Equations

a/- Linear Equation

b/- Non linear equation

c/- Integrals, Summations, and Limits

d/- Root

e/- Exponential Functions

II-4- Measures

II-4-1- Measurement

II-4-2- Standardization of measurement units

II-1- Math Numbers:

a/- Natural numbers: are those used for counting 1,2,3,4,5,……..

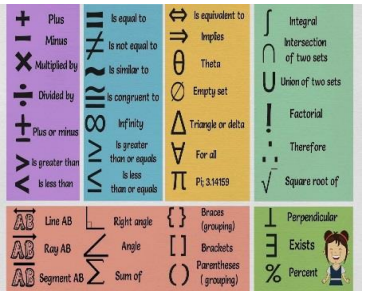
b/- Integers numbers: is a number that can be written without fractional component, e.g 21, 4, 0 ,- 243

c/- Rational numbers: a rational number is any number that can be expressed as the quotient or fraction x/y of two integers, with the denominator y not equal to zero 2/3, -3, 2.69.

d/- Real numbers: the real numbers include all the rational numbers, such as the integer -4 and the fraction 3/2, and all the irrational numbers $\sqrt{2}$ (1.41421356…,the square root of two, an irrational algebraic number) and π (3.14159265…

e/- complex numbers: A complex number is a number that can be expressed in the form a+bi, where a and b are real numbers and i is the imaginary unit, which satisfies the equation $i^2 = -1$. In this expression, a is the real part and b is the imaginary part of the complex number

II-2- Math Symbols



Math is all about numbers, symbols, and formulas. Math symbols are used for different purposes from one mathematical field to another. Using symbols to represent mathematical information makes it easier to understand expressions as these symbols show the relationship between quantities. Let us look at the common ones that we use across different branches of mathematics [1].

a/- Common Math Symbols

We have at least 10,000+ symbols and there are some that we rarely use. The most common symbols are listed in the following table:

Symbols	Meaning	Math Symbols Examples
+	Add	5 + 4 = 9
-	Subtract	5 - 4 = 1
=	Equal to	1+1 = 2
≡	Identically equal to	$(a+b)^2 \equiv a^2 + 2ab + b^2$
≈	Approximately equal to	$\Pi \approx 3.14$
≠	Not equal to	$5 + 4 \neq 1$
×	Multiply	$5 \times 4 = 20$
÷	Divide	$10 \div 2 = 5$

x,y	Variables	x=5, y=2
$\sqrt{}$	Square root	$\sqrt{4}=2$
$\sqrt[3]{x}$	Cube root of x	$\sqrt[3]{27}=3$
$\sqrt[n]{x}$	n^{th} root of x	$\sqrt[4]{16}=2$
()	Parentheses	$2+(5-3)=2+2=4$
∈	Belongs to	0 ∈ Whole number
∉	Does not belong to	1/2∉ Natural numbers
∴	Therefore	x+1=2∴ x=1
∵	Because	1/2÷0.5=1(∵1/2=0.5)
∞	Infinity	Infinity is countless, 1/3 when written in decimal form, is endless 0.333.....
!	Factorial	5! =5×4×3×2×1

b/- Math Symbols Used in Logic

The following table shows the math symbols used in logic.

Symbols	Meaning	Math Symbols Examples
∃	There exists at least one	∃ x: P(x)∃ x: F(x) There exists at least one element of p(x), x, such that F(x) is True.
∃!	There exists one and only one	∃! x: F(x) means that there is exactly one x such that F(x) is true.
∀	For all	∀n>1; $n^2>1$
¬	Logical Not	Statement A is true only if ¬ is false x≠y ⇔ ¬(x=y)
∨	Logical OR	The statement A ∨ B is true if A or B is true; if both are false, the statement is false.
A	Logical And	The statement A A B is true if A and B are both true; else it is false.
⟹	Implies	x = 2 ⟹ $x^2 = 4$
⇔	If and only if	x +1 = y +1 ⇔ x = y

c/- Geometry and Algebra Symbols

The table given below shows the commonly used geometrical symbols. The mathematical symbols with names and examples are also listed in the table

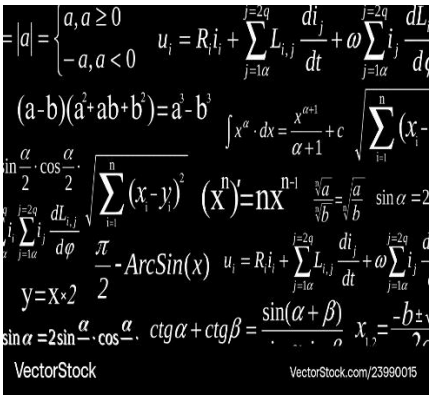
Symbols	Meaning	Math Symbols Examples
∠	Mention the angle	∠ABC∠
Δ	Triangle symbol	ΔPQR
≅	Congruent to	ΔPQR≅ΔABC
~	Similar to	ΔPQR~ΔABC
⊥	Is perpendicular with	AB ⊥ PQ
‖	Is parallel with	AB ‖ CD
∘	Degree	60∘
$\overline{\quad\quad}$AB	Line segment AB	A line from Point A to Point B
−⃗→AB	Ray AB	A line starting from Point A and extends through B
↔AB	Line AB	An infinite line passing through points A and B

d/- Greek Alphabets and Combinatory Symbols

The table below shows the Greek alphabets that are used as mathematical symbols. Their names, usage, and example are also listed in the table.

Symbols	Meaning	Math Symbols Examples
α	Alpha	Used to denote angles, coefficients
β	Beta	Used to denote angles, coefficients
γ	Gamma	Used to denote angles, coefficients
Δ	Delta	Discriminant symbol
ε	Epsilon	Used to represent Universal Set
λ	Lambda	Represents constant
π	Pi	π≈3.14
Σ	Sigma	Represents the sum
Θ	Theta	Represents angles
P	Rho	Statistical constant
Φ	Phi	Diameter symbol

II-3- Math Equations:



- Mathematical equations can present difficult and costly problems of type composition.Because equations often must be retyped and reformatted during composition, errors can be introduced. Keep in mind that typesetters will reproduce what they see rather than what the equation should look like. Therefore, preparation of the manuscript copy and all directions and identification of letters and symbols must be clear, so that those lacking in mathematical expertise can follow the copy [1].

- An equation can use any combination of mathematical operations, including addition, subtraction, division, or multiplication.

a/- Linear Equation : equation of line (slope and intercept form), is a straight line on the coordinate plane can be described by the equation ***y=ax+b***

Where: **a** is the slope of the line and **b** is the intercept

b/- Non linear equation: equation whose graph does not form a straight line (linear)

e.g : $\mathbf{6x^2+3y-1=0}$

c/- Integrals, Summations, and Limits

With single integral signs, the upper and lower limits should always be placed to the right of the integral sign, never above and below. In text, this can be accomplished by stacking supers and subs $\int_{\infty}^{0} f$ For summations, the limits above and below are customary in display equations; in text, however, and in the numerator and/or denominator of display equations, the right-side position is required.

d/- Roots

As practical, use negative exponents or the solidus instead of display fractions and fractional powers instead of the radical sign. For example,

$$-\frac{\cos\frac{1}{x}}{\sqrt{a+\frac{b}{x}}}$$

is better written as

$$\frac{\cos\ (1/x)}{[a+(b/x)]^{1/2}}$$

Nonetheless, considerations of space should not override clarity. The previous equation can be further condensed to fit within the text line as $[\cos(1/x)]/\{[a+(b/x)]_{1/2}\}$, but this is not necessarily the best presentation.

e/- Exponential Functions:

For lengthy or complex exponents, the symbol exp is preferred, particularly if such exponentials appear in the body of the text. Thus, exp $(a^2 + b^2)^{1/2}$ is preferable to $e^{(a2\ +\ b2)1/2}$. The larger size of symbols permitted by this usage also makes reading easier.

II-4- Measures:

II-4-1- Measurement is the process of attaching a numeric value to an aspect of natural phenomenon, such as the volume of the milk produced by a goat.

To begin the process of measurement, we need to recognize the type of phenomenon, called the **physical dimension** that we would like to measure. For example, the diameter of the front wheel of a bicycle is of type **Length,** how fast the bicycle is moving is described by **Speed** and the amount of air crammed inside the wheel is determined by **Pressure.**

II-4-2- Standardization of measurement units

Measurements are most commonly made in the SI system, which contains seven fundamental units: **kilogram, meter, candela, second, ampere, Kelvin, and mole.** These units are cited inthe table below, which serves as a standard.

Base quantity	**Base.unit**	**symbol**	**Current SI constants**
Time	Second	S	Hyperfine splitting in Cesium-133
Length	Meter	M	Speed of light in vacuum, c
Mass	Kilogram	Kg	Mass of international prototype kilogram (IPK)
Electric current	Ampere	A	Permeability of free space, permittivity of free space
Temperature	Kelvin	K	Triple point of water, absolute zero
Amount substance	Mole	Mol	Molar mass of carbon -12
Luminous intensity	Candela	Cd	Luminous efficacy of 540 THz source

a/- Length: the distance from one end of something to the other end: a measurement of how long something is. The units are: meter, centimeter, pond, inch……

b/- Surface: a surface is a set of points on which it is possible to identify locally using two real coordinates, as in the plane(with x and y coordinates) . The unit is m^2 or cm^2……

c/- Volume: the volume, physical science or mathematics, is a quantity that measures the extension of an object or part of the space. The volume unit is M^3, L

d/- Power: We can define power as the rate of doing work, it is the work done in unit time. The SI unit of power is Watt (W) which is joules per second (J/s). Sometimes the power of motor vehicles and other machines is given in terms of Horsepower (hp), which is approximately equal to 745.7 watts[2] .

Bibliography:

[1] https://www.cuemath.com/numbers/math-symbols/

[2] https://www.vedantu.com/physics/standard-units-of-measurements