Chapter 1: Maths symbols and equations – English vocabulary

I.1 Introduction

Mathematical symbols are used to perform various operations. The symbolsmake it easier to refer mathematical quantities. It is interesting to note that mathematics is completely based on numbers and symbols. The math symbols not onlyrefer to different quantities but also represent the relationship between two quantities. All mathematical symbols are mainly used to perform mathematical operations under various concepts [1].

The purpose of this chapter is to show how to read mathematical symbols and equations in English.

I.2 Symbols and basic mathematical operations

I.2.1 Addition

\+ → **Plus** or **add**

$2 + 4 = 6$ ← The result of the addition is called: **a sum**

Addition sign or **plus sign** — **Equals sign** or **equal sign**

We read the whole equation like this:

"**Two plus four equals six**" or "**Two and four is six**"

If you want to explain this equation to someone, than you can say:

"**If you add two and four together you get six**"

I.2.2 Subtraction

\- → **Minus** or **take away**

$5 - 2 = 3$ ← The result of the subtraction is called: **a difference**

Subtraction sign or minus sign — **Equals sign**

We read the whole equation like this:

"**Five minus two equals three**"

If you want to explain this equation to someone, than you can say:

"**If you take two away from five you get three**"

I.2.3 Multiplication

× → **Times** or **multiplied by**

$$2 \times 4 = 8$$

The result of the multiplication is called: **a product**

Multiplication sign or **times sign**

Equals sign

We read the whole equation like this:

"**Two times four equals eight**"

If you want to explain this equation to someone, than you can say:

"**If you multiply two by four you get eight**"

I.2.4 Division

÷ → **Divided by**

$$10 \div 2 = 5$$

The result of the division is called: **a quotient**

Division sign

Equals sign

We read the whole equation like this:

"**Ten divided by two equals five**"

If you want to explain this equation to someone, than you can say:

"**If you divided ten by two you get five**"

On some occasions, you will have **brackets** used in equations like this:

$$(1 + 2) \times 4 = 12$$

We read the whole equation like this:

"**One plus two in brackets, times four equals twelve**"

I.2.5 Other symbols

As you know, equations are not always equal. Sometimes you can get different symbols ($>$; $\geq$; $<$; $\leq$; $\neq$; $\approx$).

Let's see some examples:

$x = 4$ → "**x equals four**"

$x \neq 4$ → This how we read it : "**x is not equal to four**"

$x > 4$ → "**x is greater than four**" or "**x is more than four**"

$x \geq 4$ → "**x is greater than or equal to four**"

$x < 4$ → "**x is smaller than four**" or "**x is less than four**"

$x \leq 4$ → "**x is smaller than or equal to four**"

$x \approx 4$ → "**x is approximately equal to four**"

Now, we can move onto: fractions, decimals, roots and exponents.

I.2.6 Fractions

The number at the top is called **the numerator**

$\frac{1}{4}$

The number at the bottom is called **the denominator**

We read this fraction as "**One fourth**"

If the numerator is greater than one, than we add the letter (s) to the ordinal number in the denominator. For example:

$\frac{2}{4}$

We read this fraction as "**Two fourths**"

I.2.7 Decimals

0.5 → The **dot** in the middle is called **the period** or **decimal point**.

This is how to read it : "**zero point five**" or "**five tenths**".

Zero can be omitted and we can say "**point five**"

If the decimal number is long like this 82.777, than we say "**Eighty-two point seven seven seven**"

We never say: "Eighty-two point seven hundred and seventy-seven" this would be incorrect.

Let's move onto square roots.

I.2.8 Square roots

$\sqrt{6}$

The first symbol is called **radical sign** or **square root sign**

This is how we read it: "**the square root of six**".

If there is a number above the radical sign $\sqrt[5]{42}$, we read it like this: "**the fifth root of forty-two**"

However, there is an exception: if the number above the radical sign is three $\sqrt[3]{9}$, than we do not say "the third root of nine" but rather "**the cube root of nine**"

I.2.9 Exponents

The small value in this example is called exponent

3^2

We read the number as: "**three squared**"

If the exponent value is three, than we read "**three cubed**"

If the exponent value is greater than three like in this example: 3^5. We read "**three to the power of five**"

Now is the time to test your knowledge!

Relational operators

$>$: **greater than**

$\geq$: **greater than or equal to**

$<$: **less than**

$\leq$: **less than or equal to**

$\ll$ **: much less than**

$\gg$ **: much greater than**

$\cup$: **union**

$\cap$: **intersection / intersect**

Examples:

4 > 3 : four **is greater than** three

$x \geq z$: x **is greater than or equal to** z

3 < 4 : three **is less than** four

$z \leq x$: z **is less than or equal to** x

0 < x < 1 : x **is greater than** zero **and less than** 1

$A \cup B$: A **union** B

$A \cap B$: A **intersect** B

$A \cap (B \cup C) = (A \cup B) \cap (A \cup C)$:

A **intersect** B **union** C **is equal to** A **union** B, **intersect** A **union** C *or*

The intersection of A **and** B **union** C **equals the intersection of** A **union** B **and** A **union** C.

Basic symbols

∈ : **belongs to/an element of / in**

∉ **: does not belong to/ not an element of/ not in**

⊂ : **contained in; a proper subset of**

⊆ **: contained in; subset**

⊇**: a superset** ⊃**: a proper superset**

Examples:

x ∈ A : x **belongs to** A;

x **is a member of** A;

x **is an element of** A

x∉ A : x **does not belong to** A;

x **is not a member of** A;

x **is not an element of** A

$A \subset B$: A **is contained in** B;

A **is a proper subset of** B

$A \subseteq B$: A **is contained in** B;

A **is a subset of** B

$\exists$: **there exists**

$\nexists$: **there does not exist**

$\forall$: **for all**

$\perp$: **perpendicular to**

$\parallel$: **parallel to**

$\rightarrow$**: gives/ approaches**

$\Rightarrow$**: implies/ imply** $\not\Rightarrow$**: does not imply**

$\Leftrightarrow$ **: equivalent to** $\not\Leftrightarrow$ **: not equivalent to**

Examples:

$\boldsymbol{\overline{AC} \perp \overline{AB}}$: The line segment AB is **perpendicular to** the line segment AC *or*

The line segments AB and AC are perpendicular.

$\boldsymbol{A \Rightarrow B}$ **:** A **implies** B

$\boldsymbol{A \Leftrightarrow B}$ **:** A **is equivalent to** B

$\boldsymbol{A \not\Leftrightarrow B}$ **:** A **is not equivalent to** B

(**: left parenthesis (Open parenthesis) (Open bracket)**

) **: right parenthesis (Close parenthesis) (Close bracket)**

(...) : Open parenthesis … close parenthesis or … all in parenthesis

[ ] : left and right square brackets

{ } **: curly brackets or braces**

$\langle\ \rangle$ **: angle brackets**

$[\![\ ]\!]$ **: double brackets**

∞ **: infinity**

% **: percent**

|x| : **absolute value of x, modulus x**

n! : **n factorial; factorial n**

Examples:

(x+y): **Open parenthesis x plus y close parenthesis** or

x plus y all in parenthesis

Exponent:

b^n is called "***b* raised to the *n*th power**", "***b* (raised) to the power of *n***", "**the *n*th power of *b***",

"***b* to the *n*th power**", or "***b* to the *n*th**"

base^{exponent}=power

x^2: x squared

x^3: x cubed

x^4: x to the fourth; x to the power of four

x^n : x to the n; x to the n*th*, x to the power of n

x^{-n} : x to the minus n; x to the power of minus n Examples:

8^2 : "8 to the second power", or "8 squared"

4^5 : four to the power of five or four to the fifth power

5^{10} : five to the tenth power *or* five to the power of ten

$5x10^5$: five times ten to the fifth *or* five times ten to the fifth power

$6.634x10^{15}$: six point six three four times ten to the fifteenth