

MATHEMATICAL SYMBOLS AND VOCAB

A STUDY GUIDE

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1. HOW TO USE THIS STUDY GUIDE

The purpose of this guide, is to help you while you're doing your homework. It is important that you understand you will NOT be allowed to use this on a test or in the final!

To get the most out of this study guide, I suggest you take time to read and understand the material it contains. And use it regularly until you feel comfortable without it.

NOTE: If you find a mathematical error or a definition that's wrong, and report it to me, you'll receive extra credit.

2. MATHEMATICAL SYMBOLS AND THEIR MEANING

- Sets: {"elements"}, {"elements" | "instructions for how to chose elements"}
 - The set is a fundemental way mathematicians talk about solutions to a problem.
 - The symbol $|$ is read as, "such that."
 - For example, the solution to $x - 6 = 0$ is written as $x \in \{6\}$; and, we say "x is an element of the set, 6" or "x is in the set, 6."
 - * The symbol \in is read as, "is an element of" or "in."
- Intervals: (a, b) , $[a, b)$, $(a, b]$, $[a, b]$
 - Intervals a way mathematicians will talk about "continuous" sets of numbers
 - * Continuous in this context can be thought of in the usual way.
 - * For example, the interval $(0, 1)$ includes EVERY number between 0 and 1. So chose a number, say 0.5, you can chose a number above or below it; and we can keep repeating this process FOREVER.
 - We use specific symbols to say if a number is OR isn't included at the boundry of our interval.
 - Not included:
 - * $($ OR $)$
 - Is included:
 - * $[$ OR $]$
 - For example, $[0, 1)$ is the interval from 0 to 1, including 0 but not 1. And $[0, 1]$ is the same interval, but this time it includes both 0 and 1.
 - **WARNING:** BE CAREFUL NOT TO CONFUSE THESE FOR ORDERED PAIRS!!!
- Points and Order Pairs: (a, b) , (x, y) , $(x, f(x))$
 - The order pair is one way mathematicians talk about related values at a point.
 - Often used when talking about graphs.
 - **WARNING:** BE CAREFUL NOT TO CONFUSE THESE FOR INTERVALS!!!

- Functions: $f(x)$, $g(x)$, $h(x)$, ect.
 - The function is a fundamental type of equation.
 - In order for an equation to be a function, for each value of x the equation only gives one value for y .
 - * Passes the "vertical line test"
 - The function $f(x)$ is read as, "f of x," or "the function f of x."
 - You can think of $f(x)$ as being the name of an instruction book for how to turn x into y .
 - * For example, if $f(x) = 2x + 1$, then when $x = 1$ we have $f(1) = 2(1) + 1$. This can be written as, $f(1) = 3$, which is read as, "the function at 1 is equal to 3."
 - A function has an inverse if it is "one to one." otherwise known as "injective."
 - * The inverse of a function $f(x)$ is written as, $f^{-1}(x)$; and, we read it as, "the inverse of f of x."

3. MATHEMATICAL VOCAB

- Independent Variable:
 - The independent variable of a function is the "input" variable.
 - * For example, x is the input, or independent variable, of $f(x) = y$
- Dependant Variable:
 - The dependant variable of a function is the "output" variable.
 - * For example, y is the output, or dependant variable, of $f(x) = y$
- Domain:
 - The domain of a function is the set of values which the "independent variable" belongs to.
- Range:
 - The range of a function is the set of values which the "dependant variable" belongs to.
- Surjective(Onto):
 - If an equation is "surjective," then for every y value there is at least one x .
- Injective(One-to-One):
 - If an equation is "injective," then every y value has a unique x .
 - Passes the "horizontal line test".
- Bijective(Onto and One-to-One):
 - If an equation is both surjective and injective, it forms a bijection.

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