GENERAL CONCLUSIONS ABOUT SOLVING HIGHER ORDER INEQUALITIES, METHOD OF INTERVALS

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Abstract. *Mathematics provides us with many benefits for the development of our minds. Although they seem boring, abstract and difficult to understand, if we try to understand them, they can make us better analytical thinking and great agility in our mind. This article delves into General conclusions about solving higher order inequalities, method of intervals.*

Keywords: *inequalities, mathematics, methods, intervals, science, trigonometric substitutions, functions, etc.*

ОБЩИЕ ВЫВОДЫ О РЕШЕНИИ НЕРАВЕНСТВ ВЫСШЕГО ПОРЯДКА, МЕТОД ИНТЕРВАЛОВ

Аннотация. *Математика дает нам много преимуществ для развития нашего ума. Хотя они кажутся скучными, абстрактными и трудными для понимания, если мы попытаемся понять их, они могут улучшить наше аналитическое мышление и большую гибкость нашего ума. В данной статье углубляются общие выводы о решении неравенств высших порядков методом интервалов.*

Ключевые слова: *неравенства, математика, методы, интервалы, наука, тригонометрические замены, функции и др.*

In our daily life, we use it to make simple and necessary calculations, We can observe it when we want to evaluate, weigh, measure, and although it does not seem like it, there are areas that are not taken into account, but they are also used for development. It is found in other disciplines such as psychology, economics, or in the world of art. It is for calculating proportions in sculpture and painting, and for harmonic intervals in music. Improving analytical thinking helps us better interpret everything that surrounds us. It helps us to pay more attention to mistakes, to better analyze the evidence and not to get carried away by emotions. This gives us the opportunity to see everything more clearly and logically, taking into account real data. Students prove inequalities using trigonometric substitutions Olympiad is the key to solving problems using the properties of the function as the main form of formation of mathematical knowledge, skills and abilities is considered. Mathematical knowledge is especially important in solving examples trigonometric transformations, definitions and properties of functions to expand students' scope of thinking, it is possible to develop mathematical skills and increase their interest in science. Inequalities can have:

- A set that has an infinite number of solutions.
- A set that has a discrete number of solutions.
- No solutions.

The expression

$5x - 4 > 2x + 3$

looks like an equation but with the equals sign replaced by an arrowhead. It is an example of an inequality. This denotes that the part on the left, $5x - 4$, is greater than the part on the right, $2x + 3$. We will be interested in finding the values of x for which the inequality is true.

Describing the set of solutions of the inequality f(x, y) > g(x, y), proceed as follows. First, replace the inequality sign with the equality sign and find the line that has the equation f(x,y) = g(x,y). This line divides the plane into several parts. After that, it is enough to take one point in each section and check that the inequality f(x, y) > g(x, y) exists at this point. If it is executed at this point, then it is executed in the entire part where this point is located. By combining such parts, we get a set of solutions. The peculiarity of the problems involved in the parameter is that along with the unknowns given in the questions, the numerical value is not clearly indicated parameters are involved, and they are known quantities given in a set you have to look. In this case, the value of the parameter depends on the process of solving the problem and logically and technically has a great impact on the appearance of the solution. that the answers to the problem differ sharply from each other in the exact values of the parameter possible.

Inequalities can be manipulated like equations and follow very similar rules, but there is one important exception. If you add the same number to both sides of an inequality, the inequality remains true. If you subtract the same number from both sides of the inequality, the inequality remains true. If you multiply or divide both sides of an inequality by the same positive number, the inequality remains true. But if you multiply or divide both sides of an inequality by a negative number, the inequality is no longer true. In fact, the inequality becomes reversed. This is quite easy to see because we can write that 4 > 2. But if we multiply both sides of this inequality by −1, we get −4 > −2, which is not true. We have to reverse the inequality, giving −4 < −2 in order for it to be true. This leads to difficulties when dealing with variables, because a variable can be either positive or negative. Consider the inequality

x 2 > x

It looks as though we might be able to divide both sides by x to give

x > 1

But, in fact, we cannot do this. The two inequalities x 2 > x and x > 1 are not the same. This is because in the inequality x > 1, x is clearly greater than 1. But in the inequality x 2 > x we have to take into account the possibility that x is negative, since if x is negative, x 2 (which must be positive or zero) is always greater than x. In fact the complete solution of this inequality is x > 1 or x < 0. The second part of the solution must be true since if x is negative, x 2 is always greater than x. We will see in this unit how inequalities like this are solved. Great care has to be taken when solving inequalities to make sure you do not multiply or divide by a negative number by accident. For example saying that x > y, implies that x 2 > y2 only if x and y are positive. We can see the necessity of the condition that both x and y are positive by considering x = 1 and y = −10. Since x is positive and y negative it follows that x > y; but x 2 = 1 and y 2 = 100 and so y 2 > x2.

When you are solving inequalities of higher degrees, you use the same method as with quadratic inequalities, but sometimes you have to find at least one zero of the expression to be able to factorize the expression you get on the left-hand side. This can be fixed through polynomial long division. A system of inequalities is itself a combination of inequalities. A systematic solution is any value (x, y) that transforms each of these inequalities into a real-number inequality. Multisolution systems of inequalities are intersections of sets of solutions of inequalities that make up a given system.

A set of inequalities is a separate inequality. Denote the solution is any value (x, y) such that at least one of the inequalities in the set becomes a real-number inequality. Multisolution aggregates are combinations of sets of solutions of inequalities that form a set. Historical Background The problem of proving equalities and inequalities dates back to ancient times. Special words or their abbreviations are used to designate the signs of equality and inequality. 4th century BC, Euclid, book V "Beginnings": if a, b, c, d are positive numbers and a is the largest number in the proportion a/b=c/d, then the inequality

a+d=b+c

holds. III century, the main work of Papp Alexandria "Mathematical set": if a, b, c, d are positive numbers and a/b>c/d, then the inequality ad>bc is satisfied. For more than 2000 BC, it was known that the inequality for a=b becomes a true equality. Equations and inequalities are both mathematical sentences formed by relating two expressions to each other. In an equation, the two expressions are deemed equal which is shown by the symbol =.

x=y

x is equal to y. An equation or an inequality that contains at least one variable is called an open sentence. When you substitute a number for the variable in an open sentence, the resulting statement is either true or false. If the statement is true, the number is a solution to the equation or inequality.

The solution of an inequality can be expressed in four different ways:

- Inequality notation The answer is simply expressed as x<15.
- Set notation The answer is expressed as a set: {x|x<15}. The brackets indicate a set and the vertical line means “such that,” so we read this expression as “the set of all values of x such that x is a real number less than 15”.
- Interval notation uses brackets to indicate the range of values in the solution. For example, the answer to our problem would be expressed as (−∞, 15), meaning “the interval containing all the numbers from −∞ to 15 but not actually including −∞or 15”.

The inequalities we have solved so far all have an infinite number of solutions, at least in theory. For example, the inequality 5x−14>−2(x+5) has the solution x>−3. This solution says that all real numbers greater than -3 make this inequality true, and there are infinitely many such numbers. However, in real life, sometimes we are trying to solve a problem that can only have positive integer answers, because the answers describe numbers of discrete objects. For example, suppose you are trying to figure out how many $8 CDs you can buy if you want to spend less than $50. An inequality to describe this situation would be 8x<50, and if you solved that inequality you would get x<508, or x<6.25. But could you really buy any number of CDs as long as it’s less than 6.25? No; you couldn’t really buy 6.1 CDs, or -5 CDs, or any other fractional or negative number of CDs. So if we wanted to express our solution in set notation, we couldn’t express it as the set of all numbers less than 6.25, or {x|x<6.25}. Instead, the solution is just the set containing all the nonnegative whole numbers less than 6.25, or {0, 1, 2, 3, 4, 5, 6}. When we’re solving a real-world problem dealing with discrete objects like CDs, our solution set will often be a finite set of numbers instead of an infinite interval.

An inequality can also have no solutions at all. For example, consider the inequality x−5>x+6. When we subtract x from both sides, we end up with −5>6, which is not true for any value of x. We say that this inequality has no solution. The opposite can also be true. If we flip the inequality sign in the above inequality, we get x−5<x+6, which simplifies to −5<6. That’s always true no matter what x is, so the solution to that inequality would be all real numbers, or

$(-\infty,\infty)$. Solving real-world problems that involve inequalities is very much like solving problems that involve equations.

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