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EXPONENTIAL EQUATION AND INEQUALITIES

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Abstract
This article covers points on the properties of exponential equations and inequalities as well as methods of solving.

Keywords: Equation, exponential equation, exponential inequality, logarithming, graphical method, exchange.

Introduction

Exponential equations and inequalities are one of the important sections of mathematics where the unknown value is at the exponential level. To solve this type of problem, it is necessary to know well the properties of the indicators.

What is an exponential equation?

An exponential equation refers to an equation in which an unknown value enters as the degree of some number. An exponential equation is an equation in which an unknown value is at the exponential level. That is, in the equation, an unknown value is involved as the degree of some number.

Overview:

$ax = b$

Here:

a-base ($a > 0$, $a \neq 1$

X-unknown value (indicator)

b is a given number

For example:

$2x = 8$

$3 (x+1) = 27$

What is indicative tenacity?

Exponential inequality refers to a mathematical expression representing the mutual inequality of two exponential expressions.

Exponential inequality refers to a mathematical expression representing the mutual inequality of two exponential expressions. That is, in this the unknown value is involved as the rank of some number, and the inequality relation between these ranks is given.

Overview:

$ax > by$, $ax < by$, $ax \geq by$, $ax \leq by$

Here:

base A and base b (both must be positive numbers and not equal to 1

X and y – indicators (unknown values or Numbers)

Examples:

$2x > 8$

$0.5\ x < 0.25$

$3\ (x+1) \geq 9x$

Methods for solving exponential equations and inequalities

Equivalence of bases: if the same degrees of two numbers are equal, then these numbers themselves are equal.

Logarithm: logarithm the two sides with respect to the same base and bring the indicator in front.

Exchange: introducing an auxiliary variable to make the equation appear simpler.

Graphical method: to find the cut points by graphically representing the two sides.

Examples;

$2x = 8$ where we represent the number 8 as the third degree of 2: $2x = 23$. So $x = 3$.

$3(x+1) < 27$ compare this tensibility to 33: $3\ (x+1) < 33$. Hence, $x+1 < 3$, i.e. $x < 2$.

Applications of exponential equations and inequalities

Exponential equations and inequalities are widely used in Physics, Chemistry, Biology and other fields. For example, indicative functions are used in nuclear reactions, decomposition of substances, growth of populations, and many other processes.

Exponential equations and inequalities are one of the important sections of mathematics where the unknown value is at the exponential level. To solve this type of issue, it is necessary to know well the properties of the indicators. Further examples reinforce the solutions of exponential equations and inequalities.

Equivalence of bases: if the same degrees of two numbers are equal, then these numbers themselves are equal.

For example: by making $2x = 8$ look $2x=23$, we find $x = 3$.

Logarithm: logarithm the two sides with respect to the same base and bring the indicator in front.

For example: by making $3x = 7$ look $\log_3(3x) = \log .7$, We Find $x=\log .7$.

Substitution: introducing an auxiliary variable to make the equation appear simpler.

For example: 4x-2 (x+1) + 3 = 0 can be defined as t = 2x to give the appearance of a quadratic equation.
Graphical method:

Finding the cut points by graphically describing the two sides.
am * an = A (m+n
(am) n = a (mn
am / an = A (m-n)
a0 = 1
a (- n) = 1/an

Examples:
2x = 8: by making this appear 2x=23, we find x = 3.
3(x+1) < 27: by making this look 3 (x+1) < 33, We Find x+1 < 3, i.e. x < 2.
Properties in solving exponential inequalities:
If the basis is greater than 1, multiplying or dividing the two sides by the same positive number, the signal of the tenacity does not change.
If the basis is greater than 0 and less than 1, multiplying or dividing the two sides by the same positive number, the signal of the inequality changes to the opposite.

References

1. The exponential equations can be found on the site of the young mathematical virtual school (rus.)
2. Solving exponential equations, Sosmath
3. Berggren, J. Lennart, and Singer, James. "Equation."Microsoft® Student 2009 [DVD]. Redmond, WA: Microsoft Corporation, 2008.
4. Chisholm, Hugh, ed. (1911). "Equation". Encyclopædia Britannica (11th edition). Cambridge University Press.
5. Equation, Encyclopedia of Mathematics (rus.)
6. Drawing two-and three-dimensional mathematical equations (archived on the Wayback Machine site 2009-08-16), Winplot (Eng.)
7. Solutions of various mathematical equations, EqWorld(Eng.)
8. BnF: cb119470816 (reference)GND: 4021246-4LCCN: sh85044510NDL: 00563553NKC: ph125241