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## **PROBLEMS WITH PARAMETERS**

Problems with parameters are one of the most difficult tasks of the elementary mathematics course. Their aim is to study the functions included in the problem and to solve the equations or inequalities with the further numerical coefficients. In mathematics, a **parametric equation** defines a group of quantities as functions of one or more independent variables called parameters. Parametric equations are commonly used to express the coordinates of the points that make up a geometric object such as a curve or surface, in which case the equations are collectively called a **parametric representation** or **parameterization** (alternatively spelled as **parametrization**) of the object.

For example, the equations form a parametric representation of the unit circle, where  $t$  is the parameter: A point  $(x, y)$  is on the unit circle if and only if there is a value of  $t$  such that these two equations generate that point.

While solving equations (inequalities) with parameters it is necessary to find out at which values of the parameter the given equation (inequality) has a solution, and to find all these solutions. In the case there is at least one of the permissible parameter value which is not investigated. Thus the problem is not considered to be completely solved. For a long time, tasks with parameters were included in entrance exam papers on mathematics to higher education institutions, and in recent years such tasks have been also offered during the preparation to the

external testing. Typically, not all applicants can solve such tasks, which lead to a reduction of the score for written test.

A secondary school can not teach to solve problems with parameters. This is a very difficult material that requires a lot of time; in addition, before starting to solve such problems a pupil must perfectly master the general course of mathematics.

Tasks with parameters is a test to check the level of mathematical culture, its presence or absence. One can find them not only in Algebra or Geometry. The study of Physics, Chemistry, Economy, and many other subjects often lead to the solution of problems with parameters or to the study of processes depending on the parameter. Almost every problem in the textbook of Physics or Economics is a text with algebraic parameters problem. The solution of such problems with the parameters requires:

- a special rule for writing answers to the tasks with parameters;
- the values;
- the field where formulas can be applied.

A special rule for writing the answer follows from the statement of the task with the parameters. To solve equations with parameter means finding if each parameter has a root. It is necessary to formulate conditions in solving the problem with parameters which indicate the area of admissible values of the equation or inequality, the domain of admissible parameters values [2].

The general method of solving tasks includes: knowledge of the stages of the solution, the methods of execution, the types of tasks, the justification of the choice of the method of execution on the basis of the analysis of the text of the problem, as well as the possession of the subject knowledge: concepts, definitions of terms, rules, formulas, logical methods and operations.

## **References**

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