

Descartes effects on the world of mathematics

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Abstract—This article shows, briefly how Descartes Effects on the World of Mathematics.

Rene Descartes was a famous French physicist, mathematician, philosopher and physiologist. He was the founder of modern European rationalism. Descartes was one of the most influential metaphysicians of modern times. The scientist was born on March 31, 1596 in France. Since the parents were nobles, the boy received a good education.

In 1637, René Descartes published his famous work, published in French, - "Discourse on the Method" ("The Geometry Of Rene Descartes | Mathematical Association Of America"). The scientist was the first who introduced the coefficients of equations, variables, and designated degrees. He has modified the symbols of Wyeth's theorem - this modification is used from that moment and close to the present times. Descartes denoted the coefficients as a, b, c ..., and the variables - as x, y, z. In his works, natural exponent took the modern form. He contributed to the theory of equations - formulated the rule of signs to find the number of positive and negative roots. It is also shown that a third degree equation can be solved in a square or radicals with a ruler and compass. Descartes considered symbolic algebra as universal mathematics. He wrote that it has to explain everything related to the order and measure. Descartes examined algebraic functions (polynomials), as well as a number of "mechanical" functions (spirals, cycloids). According to Descartes, there is no general study of the method to deal with transcendental functions ("Descartes - 17Th Century Mathematics - The Story Of Mathematics"). Along with Pierre Fermat, he was the author of analytic geometry. This science has allowed to connect geometry and algebra and consider it with the help of the coordinate method. Descartes proposed the coordinate system that is named after the scientist.

In 1637, Descartes wrote "The Geometry". This book is about a description of the interaction of algebra and geometry. In this book, such concepts as function and variable have been introduced for the first time. Creation of analytical geometry allowed to transfer study of geometric properties of curves on the algebraic language. This made possible to analyze the equation of the curve in a coordinate system. The "Geometry" describes the methods for solving algebraic equations (including geometrical and mechanical), the classification of algebraic curves. A new way to define the arc has been introduced with the help of equations. It was a decisive step towards the concept of function. Descartes formulated a rule of signs to determine the number of positive roots of the equation, although it does not prove it ("The Geometry Of Rene Descartes | Mathematical Association Of America").

At present, the whole world knows the contribution of Rene Descartes in mathematics. His work "Geometry" influ-

enced the development of all areas of the mathematical sciences. The origin of a negative number was interpreted with the help of the Descartes coordinate system.

Complex numbers have not yet been considered by Descartes on an equal footing with the real numbers. However, he formulated (but not proved) the fundamental theorem of algebra: the total number of real and complex roots of an algebraic equation is equal to its degree ("Descartes' Rule Of Signs"). Negative roots were traditionally considered as false roots. All inherent real numbers are defined as the ratio of the length of a segment to a special standard of length. Later, a similar definition of the real number was provided by Newton and Euler. Descartes has not yet separated algebra from geometry, but changed their priorities. The solution of the equation he understands as the development of a segment with length equal to the root of the equation. This anachronism was soon dropped by his disciples.

REFERENCES

- [1] "Descartes - 17Th Century Mathematics - The Story Of Mathematics". *Storyofmathematics.com*. N.p., 2016. Web. 3 Apr. 2016.
- [2] "Descartes' Rule Of Signs". *Wmueller.com*. N.p., 2016. Web. 3 Apr. 2016.
- [3] "The Geometry Of Rene Descartes | Mathematical Association Of America". *Maa.org*. N.p., 2016. Web. 3 Apr. 2016.
- [4] "The Geometry Of Rene Descartes | Mathematical Association Of America". *Maa.org*. N.p., 2016. Web. 3 Apr. 2016.

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