Área de la Circunferencia, Elipse y Esfera [

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text (article)

Analítica

This work presents the analytical demonstrations of the formula for the area of the circumference, ellipse and sphere, by means of integration in one variable and double integration, using the rectangular, polar and spherical coordinate systems, by means of the change of variables theorem. An application of Green's theorem is also presented, which constitutes a classic of the theorems of Vector Analysis. The main objective is to show diverse demonstrative variants by means of integration in one and two variables and to recognize that the study of the different techniques and methods of integration allow the application of differential and integral calculus to the resolution of practical problems that arise in diverse demonstrative situations of mathematics. It should be noted that these forms of demonstrations are based on the properties of the integral in one and several variables, as well as on the applications of rectangular, polar and spherical coordinate systems. The application of the Jacobian to the development of polar form integration offers a path of change of coordinates that allows the development of various integration problems to situations easier to integrate and thus to obtain new generalizations in some closed curves, such is the case of the ellipse and the sphere. The concept of area and volume is generalized to several closed figures and this allows a greater generality to these concepts by means of integration. These demonstrations can be constructed by means of other teaching and learning strategies, all of them based on the concept of integration
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