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Research on topic

“Is my chosen field a science? Geometry”

Science is the most important factor in technical and socio-cultural progress, the development of human abilities and capabilities. Modern science has made it possible to get rid of the theological worldview, focusing research on establishing the true principles of the structure of the universe. The main task of science is to identify the objective laws of reality, and its main topic - true knowledge. The **scientific knowledge criteria**, that distinguish science from other forms of knowledge, are: objectivity, evidence and validity, expressiveness in terms, rationality, provability, ability to develop. In addition, information that is communicated in a particular system of knowledge, should concern the nature of objects and systematic knowledge must be specially organized in the form of a theory or a detailed theoretical construction in a special language of concepts and categories of a given field of knowledge.

Geometry is a branch of mathematics, the science of properties of space that are related with distance, shape, size, and relative position of figures, relations and their generalization. Let's check if it satisfies the criteria of scientificity.

The **expression in terms** implies that scientific knowledge should be expressed in the system of concepts worked out by the given science (uses a specialized scientific language) that allows it to be included in the composition of a certain scientific theory. Geometry uses systems of concepts (point, segment, figure), definitions (bisector, adjacent angles) and notation (letters of the Latin alphabet and special symbols). They are used to construct theories and describe the properties of figures, i.e., scientific language is used.

To obtain knowledge, the properties of objects are studied, hypotheses are made, which become theorems after proof. For this purpose, the language of concepts is used, which allows to **systematize knowledge**.

**Evidence and validity** - the use of empirical facts and logical reasoning. There are several axioms in geometry, on the basis of which other knowledge is derived. This uses the relationship of logical consequence, such as, for example, induction and deduction, as well as proof from the opposite. It follows that all the evidence is guaranteed to be substantiated.

**Rationality** - in scientific knowledge, not just something is reported, but the necessary grounds are given on which this statement can be considered true (here the principle of sufficient reason is valid). In order for the assumptions of mathematical scientists to be considered true, it is necessary to prove them. Without proof, the assumption remains a hypothesis and does not become a theorem. Currently, there are a number of geometric problems (for example, moving sofa problem, inscribed square problem), which are still unsolved. They will remain so until an algorithm for solving them is provided, which can be tested.

**Objectivity** implies that the cognition of the phenomenon is carried out independently of the cognizing subject, there is a distraction from the interests of the cognizing individual and from everything beyond the natural. The use of inference allows geometry to automatically satisfy this criterion. It is impossible to make the wrong conclusion using proven knowledge. If an error is made in the evidence, it will not be valid and will not be accepted by the scientific community.

Essential characteristic - **information** that is communicated in a particular system of knowledge, **should concern the nature of objects**. Geometry satisfies this characteristic, because it investigates only the properties of geometric objects. Other sciences are engaged in research of everything else.

**Provable** - means that knowledge must find its confirmation in practice and be reproducible in it. The application of geometry in the real world includes automated design of building things, design of assembly systems in production, nanotechnology, computer graphics, visual graphics, video game programming and the creation of virtual reality. Geometry also plays a role in global systems of positioning, cartography, astronomy and even helps robots to see things. This would not be possible if the knowledge of geometry were wrong.

The **ability to develop** - is considered as the potential of knowledge to generate new knowledge. Geometry was invented thousands of years ago, but continues to evolve to this day. Scientists study the properties of geometric space, build new theories, set new problems and solve them. Every day it’s obtained new knowledge, which was not available yesterday.

From the above we conclude that geometry is a science. It satisfies all the scientific knowledge criteria. This is not surprising, because from the very beginning strict rules were introduced, which made it impossible to move away from the scientific approach to obtaining knowledge.