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CASE STADE AND TECHNOLOGY OF USING NON-STANDARD TESTS IN THE DEVELOPMENT OF EDUCATIONAL AND CREATIVE ACTIVITIES

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Annotation
Practical coverage of lectures, practical classes, case studies and non-standard tests for professors and teachers of geometry in higher education institutions in the organization of independent study of students.

Keywords: case-stage, non-standard test, blitz-question, second-order surfaces: ellipsoid, parabolide, hyperboloid.

Option 1 (case-stage question). Activation of knowledge (blitz-questionnaire, think-pair-share-exchange, auction).
Keys 'main goal: To expand students' understanding of second-order surfaces, to form a broad understanding of rotating surfaces, spherical surfaces, conical surfaces, ellipsoids, parabolids, hyperboloids.
Expected results of case-based learning activities:
Learns what conical surface sections are;
Can memorize the definition and properties of an ellipsoid;
Can memorize the hyperboloid tariff and its properties;
Can memorize the definition and properties of paraboloids;
Can independently solve examples and problems related to second-order surfaces;
To successfully complete this case, students must first have the following knowledge and skills:
The student should be able to: Solve the canonical equations and properties of second-order surfaces, spheres, ellipsoids, hyperboloids and paraboloids, and examples and problems related to them;
The student should be able to: identify the nature of the problem; promotes ideas; organizes independent decision-making by critically reviewing data; has few points of view, thinks logically and draws conclusions; works independently with educational data; compares, analyzes, and summarizes data.
Question case: 1. What do you think is the first geometric shape that a person is familiar with?
Answer: cylindrical because the wood used to build the house was cylindrical in shape. (shafts, buckets, wheel axles)
2. Give real-life examples of a spherical figure.
Answer: moon, earth, sun
3.Which field thinkers of the Awakening period developed the scientific rules and methods of spatial figures?
Answer: sculptors, architects and painters. (Leonardo da Vinci, Michelangelo)

4. What is depicted on the top of the tomb of Archimedes?
Answer: At the top of Archimedes' tomb is a sphere and a cylinder drawn inside it (the diameter of the base of the cylinder and the height of the cylinder are equal to the diameter of the sphere.
5. What about the surface of the globe?
Answer: The surface of a sphere is not flat, it is a curved surface. By placing the surface of the sphere on the edge of the ruler, we make sure that it does not overlap with the surface of the sphere in the same direction, just try on it.
6. How many axes does the ball have?
Answer: If a sphere is formed by rotating a semicircle, the axes of the sphere are very large.
Option 2 (case-stage-assignment)
Homework case. 1-Keys. Imagine second-order conical surfaces. Organize their sections with planes in an arbitrary order and explain what second-order lines are formed in the sections.
Answer: If a cone is cut with a plane not parallel to the base, an ellipse is formed from the lines of the second order in the section, if it is cut with a plane parallel to the axis of the cone, a hyperbola is formed from the lines of the second order.
2-Keys. Organize the situations of intersection of second-order surfaces with a straight line and determine what the set of solutions consists of.
Answer. When the positions of the second-order surfaces with the straight line are organized, the straight line has an asymptotic orientation with respect to the given surface, with the following cases:
a) a straight line intersects the surface at one point;
b) a straight line does not intersect with the surface at all;
c) a straight line belongs to the surface, that is, it is part of the surface and consists of its constructor;
if the straight line does not have an asymptotic orientation with respect to the second-order surface, the following 3 cases occur:
the straight line has two common points with the surface;
the straight line has two abstract common points with the surface;
the straight line has two common points that overlap with the surface.
3-Keys. The problem of the intersection of a plane with a second-order surface.
Answer: When a plane intersects a second-order surface:
when a plane intersects a second-order surface, a second-order line in the cut;
a straight line at the intersection of a plane with a second-order surface;
the surface is divided into two planes, the plane lying within one;
when a plane intersects a second-order surface, the plane with the surface does not have a single common point.
It is appropriate to work as a team on a case study, in which students work in small groups on the case:
1) coordinate different views of group members on the situation, key issues and ways to solve them;
2) discuss and evaluate the proposed options for the solution, select the most optimal option for the situation in terms of the problem posed;
3) develop a detailed step-by-step program to implement the chosen course of action leading to the solution of the problem situation;
4) prepare for the presentation and formalize the material to be presented.
Expected results of educational activities based on non-standard tests:
Learns what conical surface sections are;

- Can memorize the definition and properties of an ellipsoid;
- Can memorize the hyperboloid tariff and its properties;
- Can memorize paraboloid descriptive properties;
- Can independently solve examples and problems related to second-order surfaces;

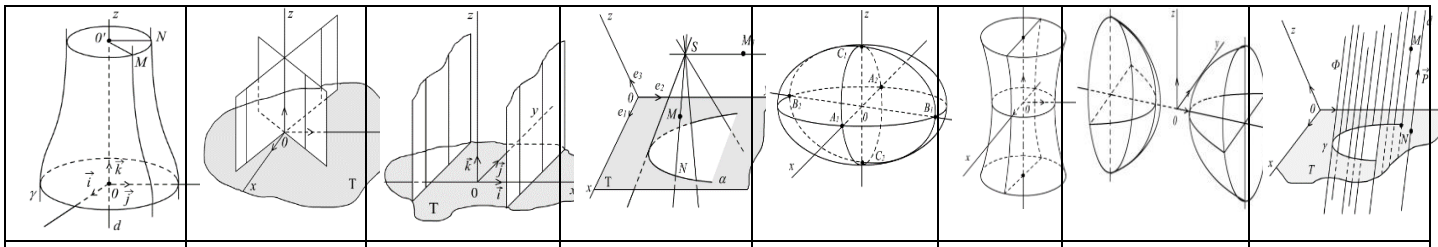
To successfully pass this non-standard test, students must first have the following knowledge and skills:

The student should be able to: Solve the canonical equations and properties of second-order surfaces, spheres, ellipsoids, hyperboloids and paraboloids, and examples and problems related to them;

The student should be able to: identify the nature of the problem; promotes ideas; organizes independent decision-making by critically reviewing data; has few points of view, thinks logically and draws conclusions; works independently with educational data; compares, analyzes, and summarizes data.

1. Place the names correctly on the geometric shapes

1) Two intersecting planes; 2) Two parallel planes; 3) Single-stage hyperboloid; 4) Cone surface; 5) Rotating surface; 6) Two-stage hyperboloid; 7) Sphere; 8) Cylindrical surface;



Answer:

5	1	2	4	7	3	6	8

2. Correctly place the names of surfaces according to geometric formulas:

1) Two intersecting planes; 2) Two parallel planes; 3) cone; 4) Parabolic cylinder; 5) elliptical cylinder; 6) hyperbolic cylinder ;

$F\left(x_0+\frac{x-x_0}{z_0-z}\cdot z_0, y_0+\frac{y-y_0}{z_0-z}\cdot z_0\right)=0$	$\frac{x^2}{a^2}-\frac{y^2}{b^2}=0$	$x^2-a^2=0$	$y^2=2px$	$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$	$\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$

Answer:

3	1	2	4	5	6

It should be noted that the department of analytical geometry and its second-order surfaces play a key role in mathematical education, they are used as a basic tool in the acquisition of basic knowledge of algebra, mathematical analysis, computer science, linear and nonlinear programming and other sciences.

This article describes the teaching technology of the lecture on the canonical equations and properties of second-order surfaces, spheres, ellipsoids, hyperboloids and paraboloids in the science of analytical geometry. Pedagogical technology, control questions, a set of non-standard tests based on the case-stage method of this topic have been developed.

I suggest that it would be expedient to use the above-mentioned development in the development of educational technology for other subjects taught in analytical geometry.

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