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Research Article

TEACHING STUDENTS TO PROVIDE THEORETICAL AND PRACTICAL KNOWLEDGE IN SOLVING PROBLEMS OF DRAWING GEOMETRY

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Jumayev Isroil
Teacher At The Department Of Engineering And Computer Graphics At Chirchik State Pedagogical University, Uzbekistan

ABSTRACT

This article shows how to improve the knowledge of students by explaining theoretical and practical problems in the teaching of drawing geometry.

KEYWORDS

Methodical, line, point, appearance, complex, trace, special line, perception, projection, spatial, image, clear, plane.

INTRODUCTION

The science of diagrammatic geometry is a branch of general geometry that studies the solution of positional and metrical problems related to their shapes, sizes, and relationships using methods of representing objects.

Schematic geometry differs from other geometries in its main method of representation, and it is inextricably linked with mathematical sciences and is considered one of the general engineering sciences. It expands the spatial imagination of its students with the help of its imaging methods. Ability to make drawings and read pre-made drawings and solve various engineering problems in practice. With the laws and rules of geometry, a diagram can describe not only existing things, but also imagined things.

Planar drawings of shapes in space are created by drawing geometry methods based on certain rules. Through these drawings, it is possible to draw the spatial shape of the object and determine its dimensions. With the help of drawings, stereometric problems related to geometric shapes are solved. It is impossible to imagine the progress of science and technology without drawings. Architects and engineers can fully express their creative ideas only with the help of drawings.

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Due to the fact that more practical aspects are being emphasized in the teaching of solving problems in schematic geometry, the level of students' mastery is much lower. The relevance of the article is that it was seen to be at a much higher rate when explained in both theoretical and practical contexts.

Determination of projections on the I-square of a point.

In the squares, the systematic indications of graphic work are explained step by step.

Problem 1: We perform the spatial and epigraphic states of the given point A (50, 40, 60) in the 1st square based on diagrams. In this case, the process of solving the problem is carried out in 4 steps, theoretically and practically.

The solution to the problem: we will show in the 1st part.

Step 1. (In spatial condition). Before constructing the spatial position of point A given by its coordinates, we measure the x50 value of point A from the beginning of the coordinate to the abscissa axis Ox, and Ax is written on the found point. The y40 value of point A is measured from the origin of the coordinate to the ordinate axis Oy, the resulting point will be the point Ay, and we can measure the value z60 of point A from the origin of the coordinate to the ordinate axis Oz, the resulting point will be the point Az . Figure 1

(in the case of Epure). The 1st square is perpendicular to 900 to the axes of Ax abscissa, Oy ordinate and Oz application, from the beginning of the coordinate, the x50 value of point A is measured to the Ox abscissa axis, and the y40 value of point A is found to the Oy ordinate axis Ay point is found by measuring, and Az point is found by measuring z60 value of point A from the origin of the coordinate to Oz application axis. Figure 1

Step 2. (In spatial condition). To determine the projection of point A' on the horizontal projection plane H of point A standing in the space of square 1, we draw a straight line parallel to the ordinate axis Ay from the point Ax found, and a straight line parallel to the abscissa axis Ox from the point Ay found it swells. The intersection of these two drawn straight lines is the projection of point A' on the plane of horizontal projections H of point A in space. Figure 2

(in the case of Epure). A straight line parallel to the ordinate axis of Oy is drawn from the point Ax located on the abscissa axis of the 1st circle, and straight lines parallel to the abscissa axis of Ox are drawn from the point Ay. The intersection of these two drawn straight lines is the projection of point A' on the plane of horizontal projections H of point A. Figure 2

Step 3. (In spatial condition). To determine the projection of point A'' of point A standing in the space in square 1 on the plane of frontal projections V, a straight line is drawn from the point Ax found, parallel to the axis of application Oz, and a straight line parallel to the abscissa axis Ox is drawn from point Az found it swells. The intersection of these two drawn straight lines is the projection of point A'' on the plane of frontal projections V of point A in space. Figure 3

(in the case of Epure). A straight line is drawn from the point Ax located on the abscissa axis Ox in the position of the 1st circle, parallel to the axis of the application Oz, and from the point Az parallel to the abscissa axis Ox is drawn. The intersection of these two drawn straight lines is the projection of point A'' on the plane of frontal projections V of point A. Figure 3

Step 4. (In spatial condition). From the projection of the point A' on the horizontal projection plane H, we draw a straight line perpendicular to the horizontal projection plane H, or a straight line parallel to the axis of the Oz application is drawn. In the same way, from

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the projection of point A'' on the plane of frontal projections V, we draw a straight line perpendicular to the plane of V frontal projections, or we draw a straight line parallel to the ordinate axis of the Moon. It is the point A in the space given by the coordinates of the intersection of two drawn straight lines, and the spatial situation of the given problem in square 1 is considered complete. Figure 4

Figure 4

Step 1

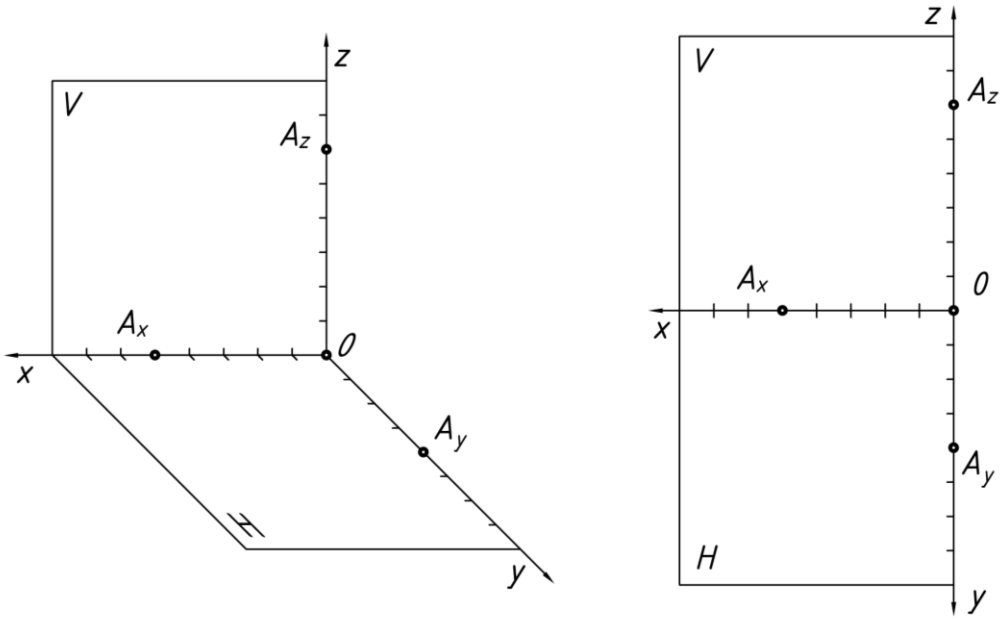

Figure 1

Step 2

(in the case of Epure). After finding the projection of point A' on the plane of horizontal projections H and the projection of point A'' on the plane of frontal projections, the work in the 1st square of the given problem is considered complete.

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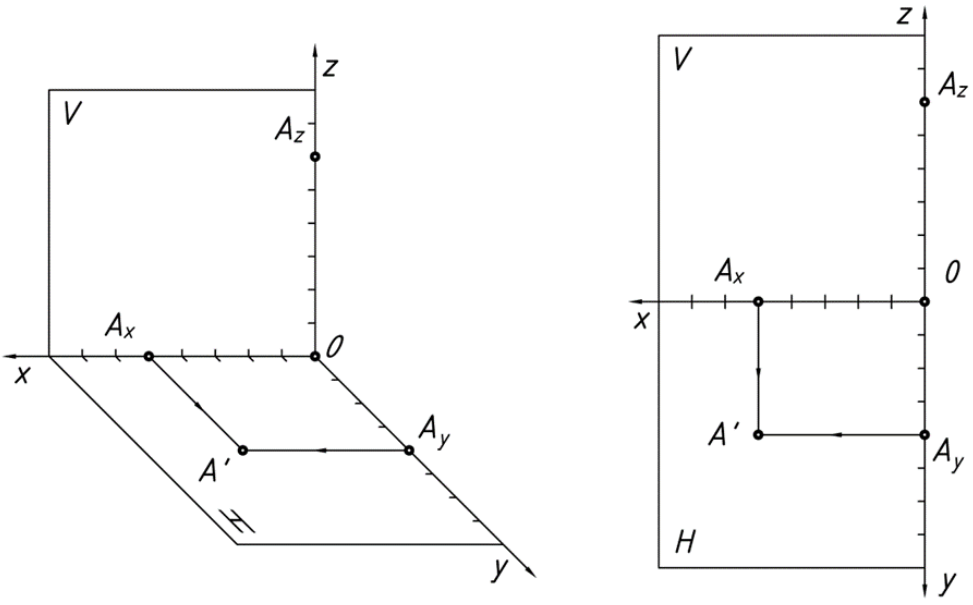

Figure 2

Step 3

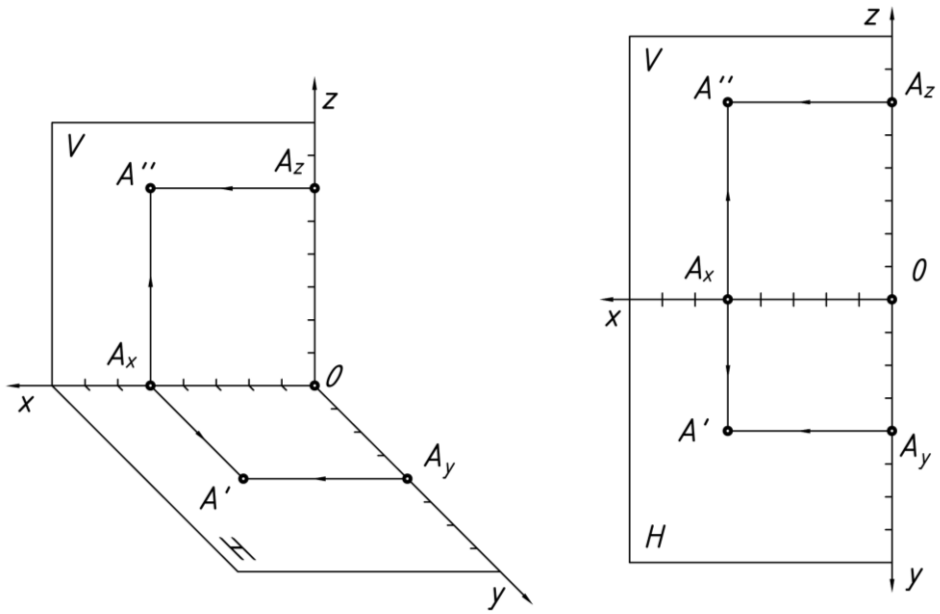

Figure 3

Step 4

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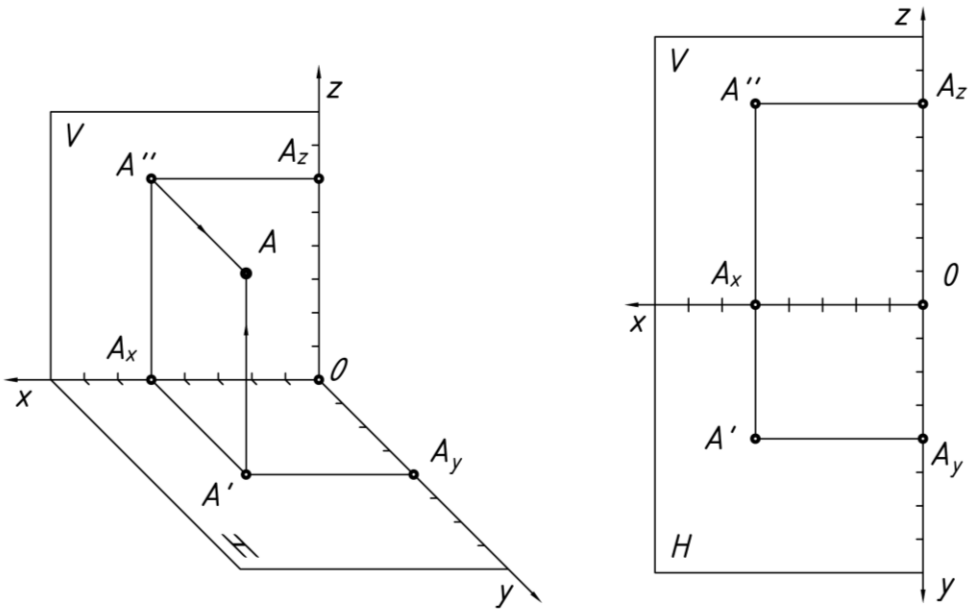

Figure 4

Determining the traces of the plane by means of special lines.

Problem: Determine the horizontal and frontal traces Φ of the plane P given by the projections of the planar shape (ΔABS(ΔA′B′S′, ΔA″B″S″)).

Solution to the problem:

Step 1. Horizontal and frontal projections of ΔABS given by coordinates (ΔA′B′S′, ΔA″B″S″) are drawn. Figure 1 a.

Step 2. ΔABS(ΔA′B′S′, ΔA″B″S″) plane horizontal h′,h″ is passed. A straight line parallel to Ox axis is drawn from A″ end of ΔABS and intersects side B″S″ and becomes a point 1″. This straight line will be horizontal h″ of the plane.

If we draw a 900-degree (perpendicular) straight line down from the 1″ point, it will intersect the B′S′ side and it will be the 1′ point. If we draw a straight line crossing the point 1′ from the end of A′, this straight line will be horizontal h′ of the plane.

Now we draw a horizontal line h1′,h1″ of one plane, the points 2′,2″ and 3′,3″ are also found in this way.

We can find the horizontal lines h′,h″ and h1′,h1″ of this found plane, the frontal traces, the points 7′v,7″v and 8′v,8″v.

The front of the plane ΔABS f ′, f ″ is transferred. A straight line parallel to the Ox axis is drawn from the B′ end of the plane and crosses the A′S′ side to become a point 4′. This straight line will be the front f ′ of the plane.

If we draw a 900-degree (perpendicular) straight line from the 4′ point to the top, it will intersect the A″S″ side and it will be the 4″ point. If we draw a straight line crossing the point 4″ from the end of B″, this straight line will be the front f″ of the plane.

Now we draw a line f1′, f1″ on the front of one plane, the points 5′, 5″ and 6′, 6″ are also found in this way.

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The fronts of this found plane are f ′, f ″ and f1′, f1″, we can find the horizontal traces of the straight lines 9′, 9″ and 10′, 10″. Figure 2 b.

Step 3. ΔABS (ΔA′B′S′, ΔA″B″S″) horizontal lines h′,h″ and h1′,h1″ found in the plane intersect the frontal traces at points 7″ and 8″ If we draw a straight line, this straight line will be the frontal PV trace of the P plane.

ΔABS (ΔA′B′S′, ΔA″B″S″) in the plane of the fronts f ′, f ″ and f1′, f1″ intersect the horizontal traces of the straight lines 9′ and 10′ If we draw a straight line, this straight line will be the horizontal Φ trace of the plane P.

The horizontals h′ and h1′ are parallel to the horizontal trace Φ of the plane Π //h′//h1′ and the projections h″ and h1″ are parallel to the Ox axis Ox//h″//h1″.

The frontal PV // f ″// f1 ″ of the frontal PV trace of the plane P is parallel to the frontal PV // f ″// f1 ″, and the projections of f ′ and f1′ are parallel to the Ox axis Ox// f ′// f1′.

P horizontal and PV frontal traces of the P plane given by the projections of the planar shape (ΔABS(ΔA′B′S′, ΔA″B″S″)) are completed using horizontals and frontals. Figure 3 d.

Step 1

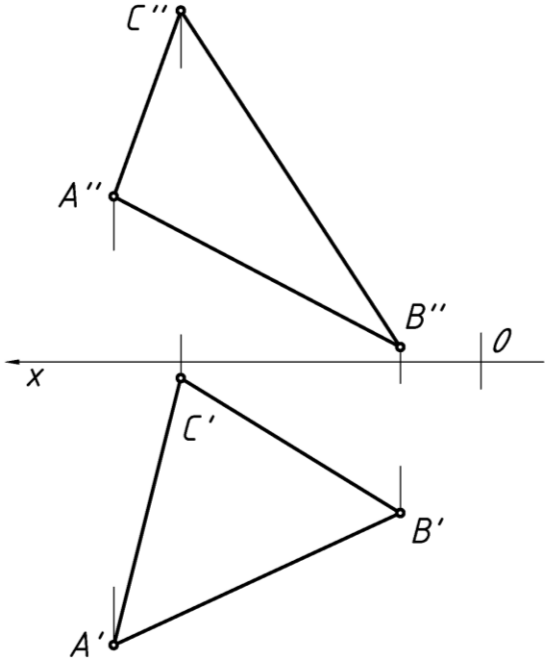

Figure 1a

Step 2

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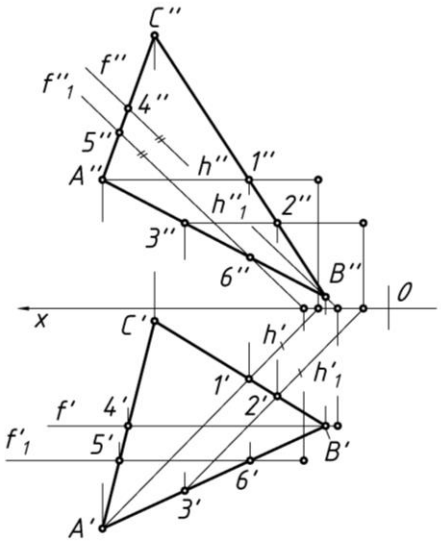

Figure 2b

Step 3

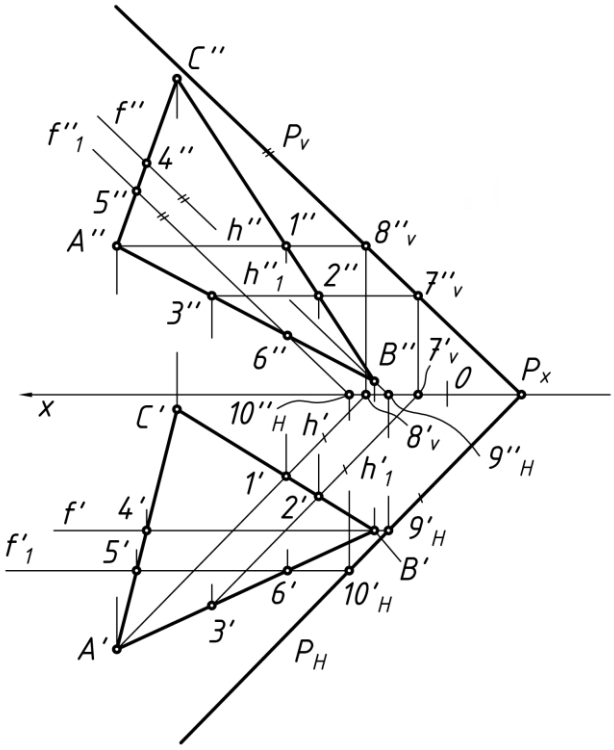

Figure 3d

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