

## «ADVANTAGES OF USING AutoCAD GRAPHIC SOFTWARE IN DRAWING DESCRIPTIVE GEOMETRY AND PERSPECTIVE DRAWINGS»

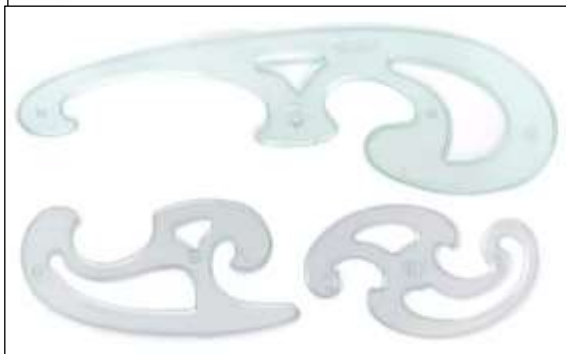
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### ANNOTATSIYA

**Annotation:** Basic primitives in AutoCAD graphic software. Analytical methods for designing complex primitives and drawings. Stages of the design process. The design workflow. Creating a flat-contour part drawing in AutoCAD graphic software. Rotating, moving, mirroring, and stretching objects. Constructing objects in AutoCAD graphic software. Creating sections, extrusions, attachments, adding dimensions, and applying scales to objects. Constructing objects using editing tools in AutoCAD graphic software.

**Keywords:** AutoCAD graphic software, basic primitives, complex primitives, analytical methods, design stages, design process, rotating objects, moving, mirroring, stretching.

**Introduction.** Descriptive geometry is one of the fundamental subjects in technical and engineering education. It teaches the rules of representation, the projection of



geometric shapes, and their positions in space. Traditional teaching methods have relied on paper and drafting tools (shape-1).

Shape-1.

However, the use of modern digital technologies, particularly the AutoCAD software, significantly enhances the quality of teaching this subject. Nowadays, engineers can sit in front of a computer, move the mouse on their desk, and occasionally press keyboard buttons to draw the model of the project they are working on.

In many developed countries around the world, the use of automated design software has become a common practice. One such program is AutoCAD, a graphic software developed by the American company Autodesk, specifically designed for drawing complex projects and models. AutoCAD enables the automation of drawings on personal computers running DOS and Windows operating systems.

Any drawing that can be made by hand can be completed much faster and in a very short time using the AutoCAD graphic software.

The versatile capabilities of AutoCAD allow its wide application in fields such as architecture and construction, electronics, mechanical engineering, aerospace industry, publishing, and design.

The AutoCAD package is particularly useful for technical designers and constructors in solving complex and practical problems. Using AutoCAD, it is possible to create drawings in both two-dimensional and three-dimensional coordinate systems. The program allows switching from 2D systems to 3D space systems and vice versa.

In AutoCAD, it is possible to create planes and surfaces, develop geometric models from them, generate views of these models from any desired angle, create sections from required locations, represent them in various colors, and manipulate the views by panning, rotating, and moving.

Since AutoCAD is a complex software, it is recommended to start with simple drawings. First, one should become familiar with the AutoCAD command panel. After learning the command panel, drawings should be created gradually — from simple to complex.

### **A brief overview of the AutoCAD software.**

**AutoCAD** is a professional graphic system developed by **Autodesk**, which allows users to create, edit, save, and print two-dimensional (2D) and three-dimensional (3D) drawings. It is widely used in fields such as engineering, architecture, construction, and industrial design.

As of today, the 2025 version of the AutoCAD graphic software has been released and made available to users. This clearly demonstrates that the program is continuously evolving, taking into account user feedback and suggestions. The software is based on the theory of descriptive geometry and engineering graphics, meaning that drawing operations can be carried out according to drawing rules and state standards.

In AutoCAD, it is possible to perform operations ranging from drawing simple lines to creating complex surfaces. Additionally, the software allows the creation and editing of both 2D and 3D objects. Its capabilities to transform simple shapes into models are particularly noteworthy.

<b>Versiya</b>	<b>Hotira</b>	<b>Videoadptr</b>	<b>Operatsion tizm</b>	<b>Diskda</b>
AutoCAD 2014	2gb (4gb)	1gb DireceX11 (4gb DireceX12)	Windows 7, 8.1,XP	6gb
AutoCAD 2015	2gb (8gb)	DireceX9 ( DireceX11)	Windows 7, 8.1,	6gb
AutoCAD 2016	4gb (4gb)	DireceX9 ( DireceX11)	Windows 7, 8.1, 10, 11	6gb
AutoCAD 2017	4gb (8gb)	DireceX9 ( DireceX11)	Windows 7, 8.1, 10, 11	6gb
AutoCAD 2018	4gb (8gb)	DireceX9 ( DireceX11)	Windows 7, 8.1, 10, 11	6gb
AutoCAD 2019	4gb (16gb)	1gb DireceX11 (4gb DireceX11)	Windows 7, 8.1, 10, 11	6gb
AutoCAD 2020	4gb (16gb)	1gb DireceX11 (4gb DireceX11)	Windows 7, 8.1, 10, 11	6gb
AutoCAD 2021	4gb (16gb)	1gb DireceX11 (4gb DireceX11)	Windows 10, 11	7gb
AutoCAD 2022	4gb (16gb)	1gb DireceX11 (4gb DireceX12)	Windows 10, 11	10gb
AutoCAD 2023	4gb (16gb)	1gb DireceX11 (4gb DireceX12)	Windows 10, 11	10gb
AutoCAD 2024	4gb (32gb)	2gb DireceX11 (8gb DireceX12)	Windows 10, 11	10gb
AutoCAD 2025	8gb (32gb)	2gb DireceX11 (8gb DireceX12)	Windows 10, 11	10gb



## AutoCAD

- **Function:** Creating 2D and 3D drawings, design, and modeling.
- **Field:** Architecture, engineering, construction, mechanical design, and other related fields.
- **Features:** Automation, working with drawings, support for extensions and integrations, 3D modeling.

### Advantages of Using AutoCAD in Teaching Descriptive Geometry.

Let us explore the advantages of using AutoCAD software in teaching descriptive geometry:

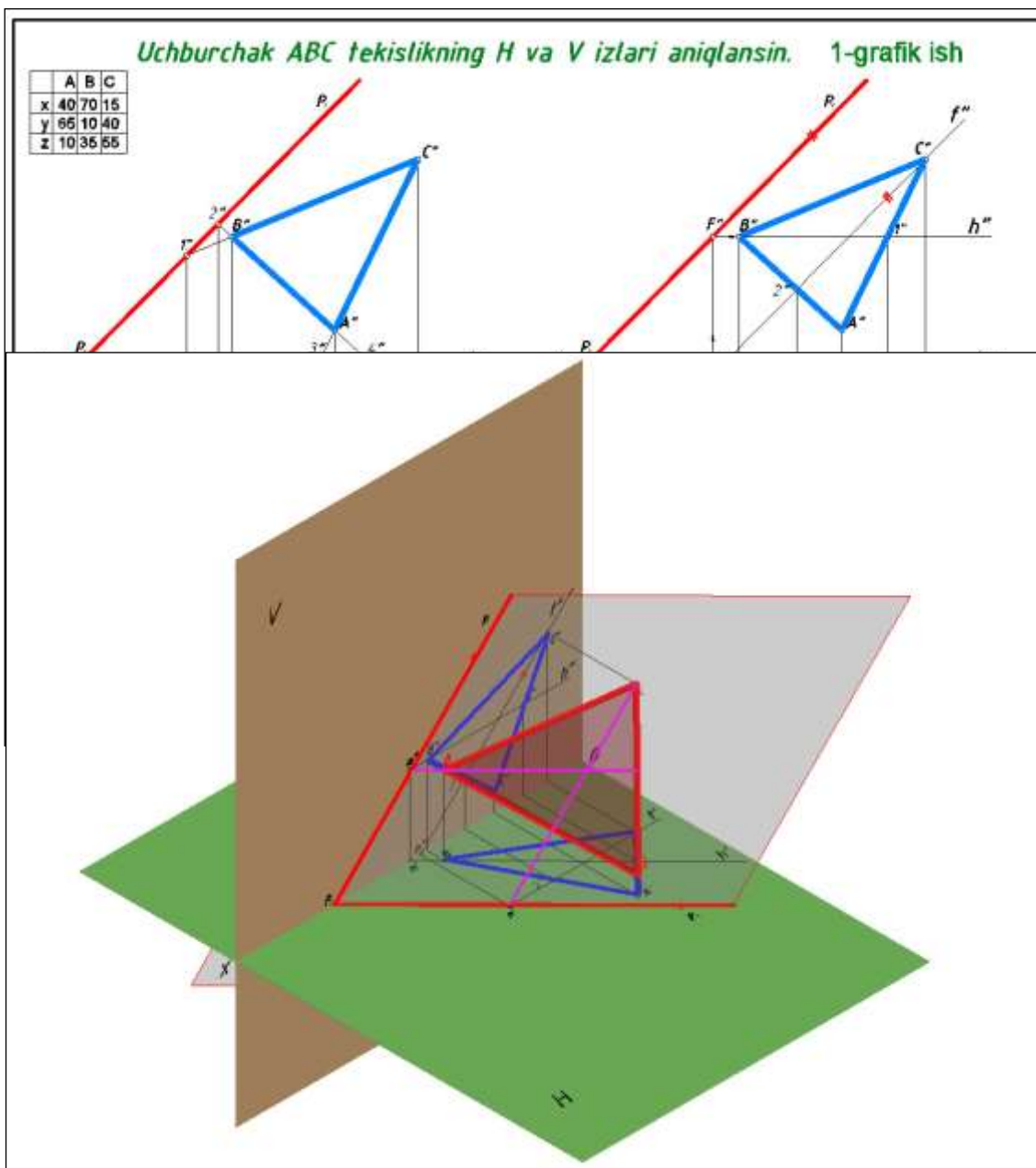
1. **Precision and Accuracy:** AutoCAD enables geometric drawings to be created with millimeter precision. This is particularly important when illustrating complex geometric projections.
2. **Time Efficiency:** The software allows automatic construction of lines, circles, intersections, and projections. This significantly reduces the time required to complete a drawing.
3. **Error Reduction:** AutoCAD's automatic correction tools help identify and fix drawing errors. It also ensures that dimensions and angles are displayed with high accuracy.
4. **Three-Dimensional Visualization:** Traditional methods only support working with two-dimensional projections. AutoCAD, however, allows users to create 3D models and view them from multiple spatial perspectives.
5. **Interactive and Visual Learning Environment:** Students can create drawings interactively using AutoCAD, allowing them to view, rotate, cut, and analyze models. This enhances their spatial imagination and understanding.
6. **Convenience in Editing and Saving Drawings:** Drawings are stored digitally and can be edited at any time. Additionally, they can be easily duplicated, shared, and exported into various formats. The Layout section in particular allows users to place both 2D and 3D drawings on a single sheet.
7. **Preparation for the Modern Job Market:** In many technical professions, knowledge and skills in AutoCAD are required. By learning to use this software, students become more competitive in the labor market.

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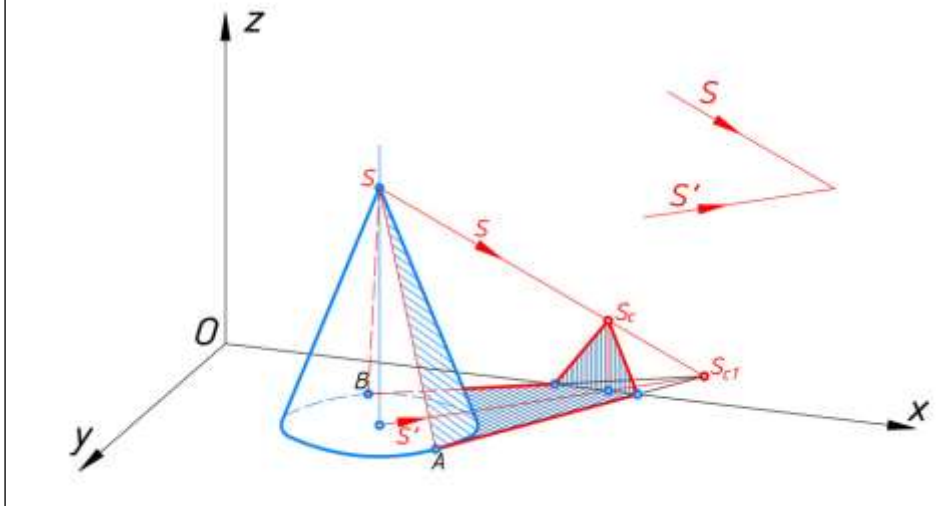
## Conclusion

Teaching descriptive geometry using AutoCAD is not only a way to utilize modern technological tools, but also a means to enhance students' professional preparedness. This approach enables learners to gain deeper knowledge of drafting and equips them to solve real-world engineering problems. Therefore, effective integration of AutoCAD into technical education can significantly improve the quality of instruction and take it to a new level.

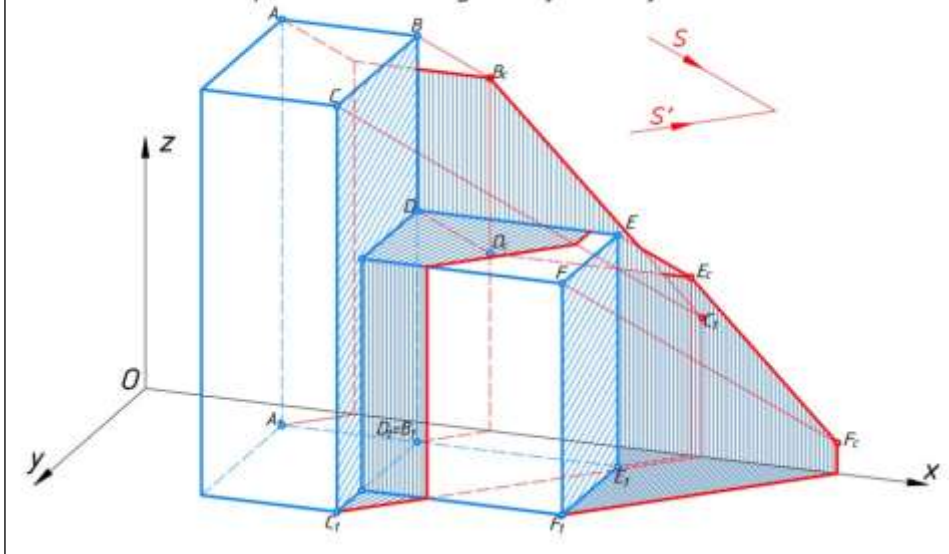
**Examples of graphics tasks drawn in AutoCAD software.**



**3-Masala:** Asosi gorizonttal tekislikda joylashgan to'g'ri doiraviy konusning soyasini qurilsin.



**5-Masala:** Aksonometrik proyeksiyalarda ikkita prizmadan tushgan soylarni yasalsin.



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