IMPROVING THE METHODOLOGY OF TEACHING ENGINEERING GRAPHICS TO FUTURE ENGINEERS USING DIGITAL TECHNOLOGIES (AUTOCAD PROGRAM)

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Abstract. *This article presents the role of engineering and computer graphics in the education of future engineers, teaching methods, and methods for creating drawings in the AutoCAD program. In addition, the engineer teaches young people modern technologies and programs.*

Keywords: *AutoCAD, interface, project, equipment, feed mechanism, wool fiber, roller.*

СОВЕРШЕНСТВОВАНИЕ МЕТОДИКИ ОБУЧЕНИЯ ИНЖЕНЕРНОЙ ГРАФИКЕ БУДУЩИХ ИНЖЕНЕРОВ С ИСПОЛЬЗОВАНИЕМ ЦИФРОВЫХ ТЕХНОЛОГИЙ (ПРОГРАММА AUTOCAD)

Аннотация. *В статье рассматривается роль инженерной и компьютерной графики в образовании будущих инженеров, методика обучения и методы создания чертежей в программе AutoCAD. Кроме того, инженер обучает молодежь современным технологиям и программам.*

Ключевые слова: *AutoCAD, интерфейс, проект, оборудование, механизм подачи, шерстяное волокно, валик.*

INTRODUCTION.

In projection drawing, there are six views of an object from all sides, which are: front, back, top, bottom, left and right side views.

However, it is sufficient to draw three of these views, that is, front (head view), top and left side views. This is because if the three main dimensions of any object, length, width and height, are determined, its clear image, its appearance in life, is formed.

It is possible to find a clear image of the object through the three views. Just as we find a point in space based on its projections, the true appearance of the object is found by looking at the contour views on a 2D plane.

RESEARCH METHODOLOGY.

In the projection drawing part of the drawing lessons, students are given the option of front and top views of the object.

The head view of the object is drawn on the V-projection plane, and the top view is drawn on the H-projection plane with the given dimensions.

To find the abstract (left view) part of the object, the H, V, W-projection planes act as a template. The front view of the object is drawn on the V-frontal projection plane,

The top view of the object is drawn on the H-horizontal projection plane, the abstract part of the object is drawn on the W-profile projection plane, and the left side view is found. When drawing this drawing, the coordinate axes act as directions.

The length dimensions of the object are drawn along the Ox-axis, the width of the object along the Oy-axis, and the height dimensions of the object along the Oz-axis[5].

To find the third view of an object, the height is taken from the head view, the width from the top view, and the abstract view is found. This **Рисование** panel ✏ **"Отрезок"**- incision, ⊙ **"Круг"**- using the circle drawing commands, the values are entered from the keyboard and drawn. Three views of an item make it easier to find a clear image of the item.
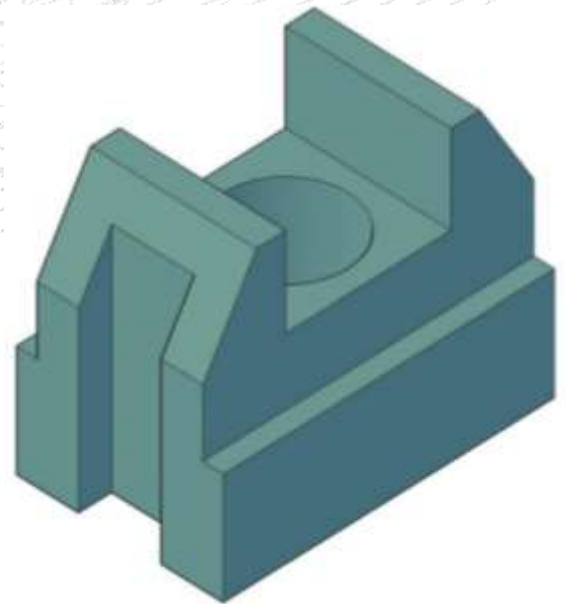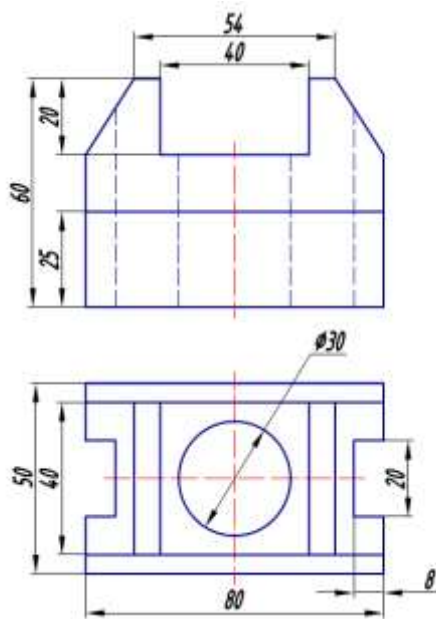
Figure 1. Variant. Two views of the object and its clear image
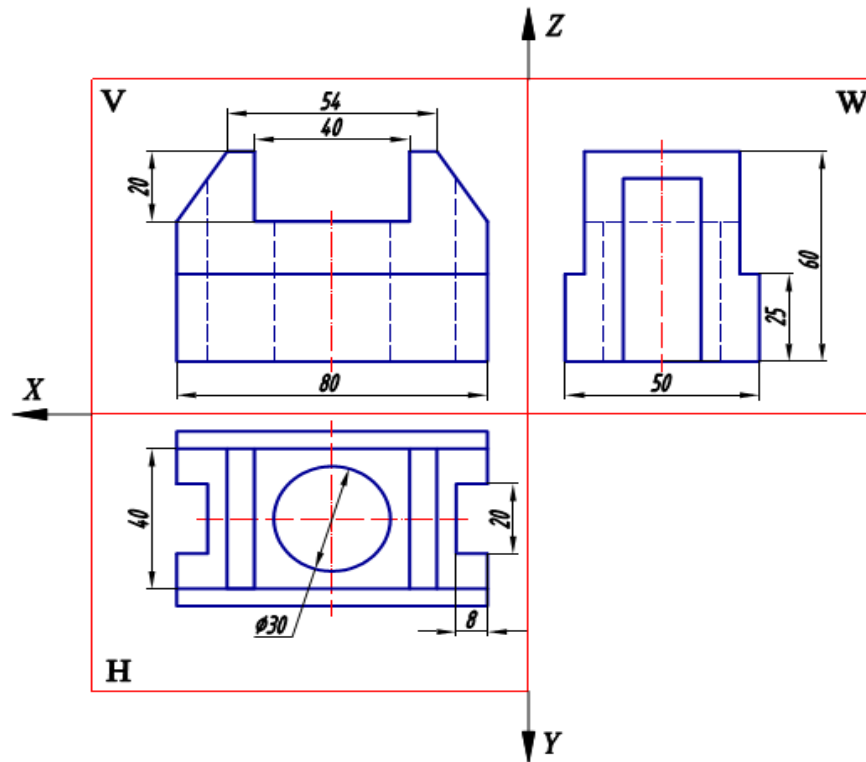
Figure 2. Finding a third view of an object given two views.

ANALYSIS AND RESULTS.

Once the three views of the object are clear, abstract information about the object's visual representation is further defined.

The visual representation of the object is created in the following sequence based on the 2D views: [1,2].

1. Once the three-dimensional views of the object are clear, **Рисование** panel **"Прямоугольник"**- The rectangle command is specified using **LM** and point **A** is selected from an arbitrary part of the graphics area. **@80,50** is entered from the keyboard and the Enter key is pressed. The total volume (length and width) of the object is generated. From the list of cases **3D моделирование** is replaced by space.

2. 3D моделирование after selecting and opening the workspace, **Главная** department **Вид** located on the panel **Несохраненный вид** arrow **LM** is determined using.

From the resulting command line **ЮЗ изометрия** command **LM** is selected using (Figure 3) and the object in the graphics area is moved to the horizontal plane.
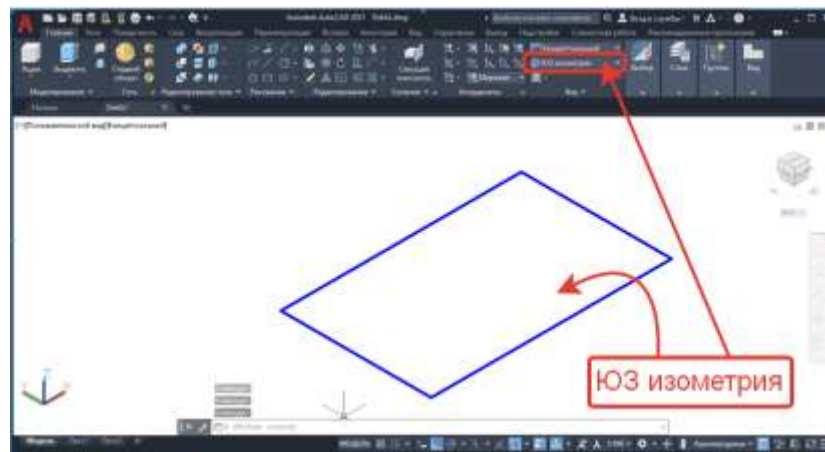
**Figure 3.** Bringing the object into a 3D isometric position.

3. After the object is converted to isometric view, **Тело** located in the department

-**Вытягивание** The command is selected using **LM,** the object is selected, the height dimension **(60 mm)** is entered from the keyboard, and Enter is pressed (Figure 3). From the 2D frame state **Концептуальный** is transferred to the status.
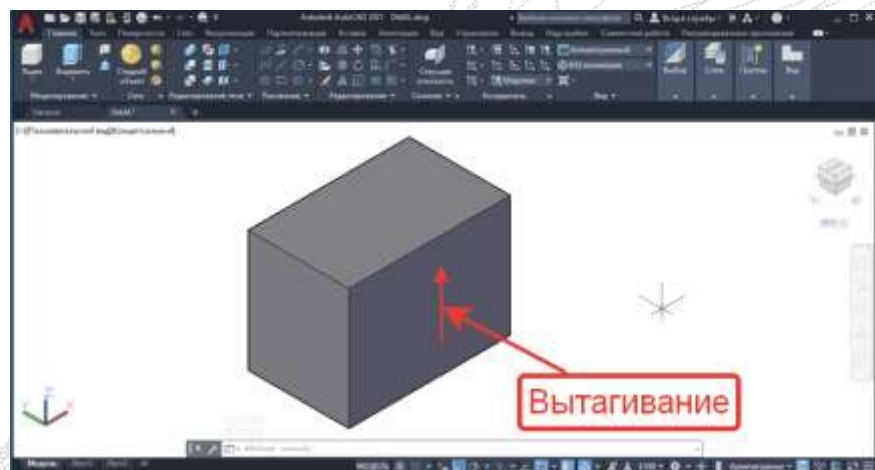
**Figure 4.** Entering the height of an object using the Extrude command.

4. Рисование panele **"Отрезок"**- Using the cut command, the front side of the object is drawn along the length and height of the object (Figure 5).

The surface of the object to be cut off is drawn and **"Область"**- The area, that is, the 3D object, is brought into a whole by the command to open the area.
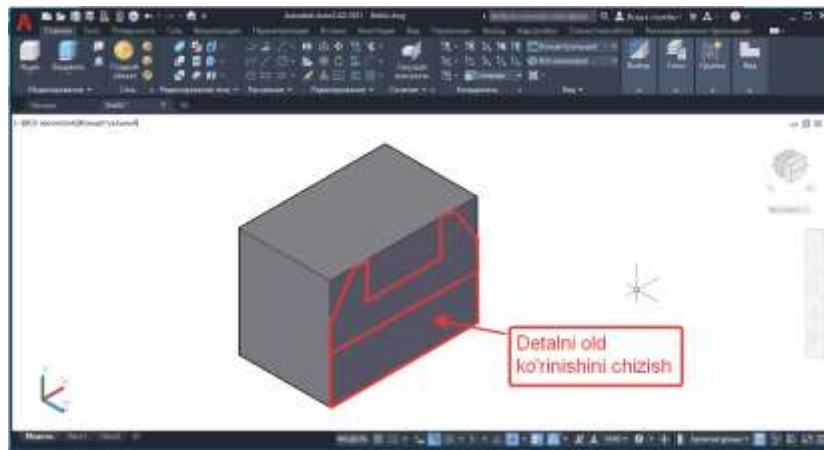
Figure 5. Drawing a front view of an object.

5. After the object's groove lines are brought into a single whole, **Главная** located in the department **Выдавить** The command is defined using **LM**. The groove lines are selected, the Enter key is pressed, and the object is moved beyond its width (Figure 6).
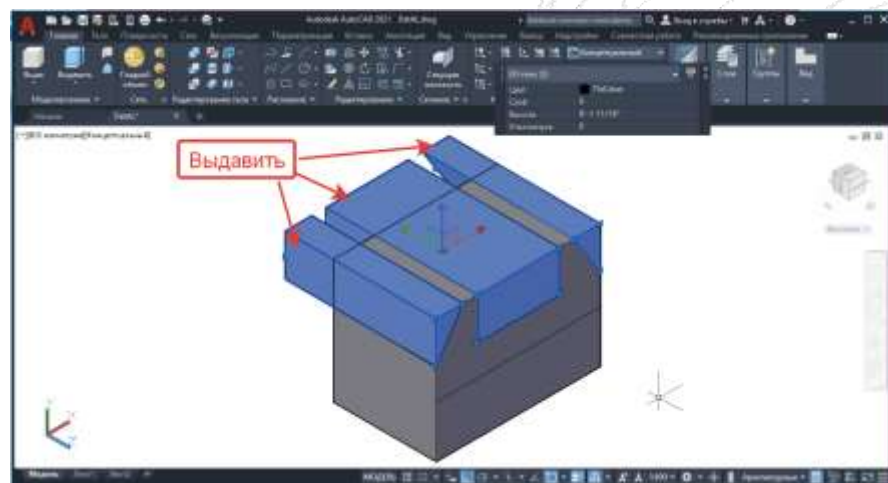

Figure 6. Using the Print command

6. **Тело** from the department **"Вычитание"**-" The "Subtract" command is selected using **LM**, and the part of the object to be retained is selected using **LM**, and **RM** is pressed.

Then the part of the object to be deleted is selected using **LM**, and **RM** is pressed. In this sequence, the excess part of the object is removed (Figure 7). Once the front view of the object is ready, the part to be carved is drawn using the Drawing panel commands.
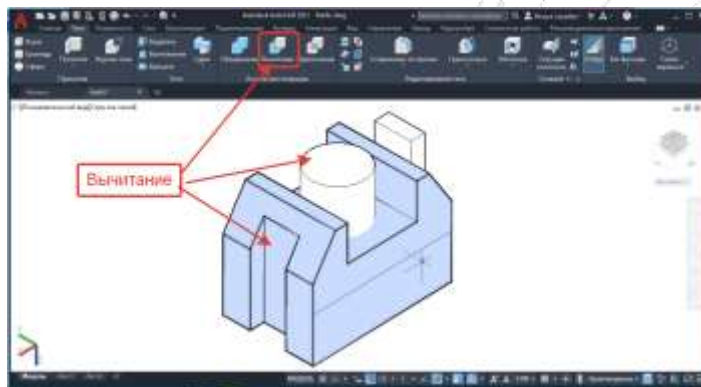
"Область"- The area command brings the groove lines together.
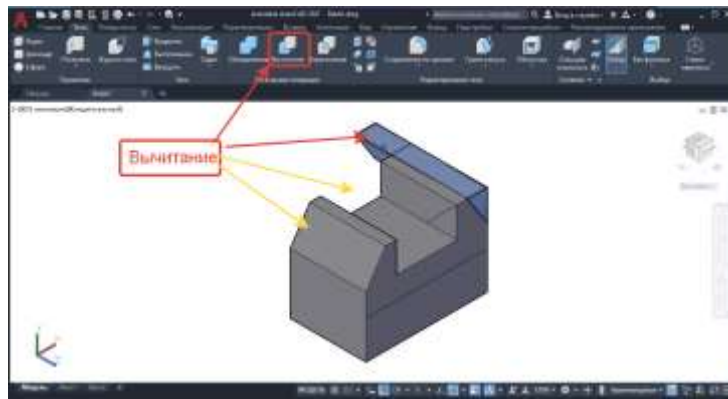
Figure 7. "Subtraction" command

7. As we mentioned above, **Главная** located in the department **Выдавить** The command removes the groove lines of the object from the object. **Тело** department **"Вычитание"**- The "Subtract" command removes the groove lines from the object (Figure 8).

(Figure 8). "Вычитание"- "Separation" order

8. In the given variant, both sides of the object are 25 mm above the base and 5 mm outside the object. This part is also **"Отрезок"**- drawn using the cut command, - **"Область"**- brought into a whole using the area command. **Главная** located in the department **Выдавить** The command is used to move the object outward by 5 mm on both sides.

9. Тело department **Объединение** – **birlashtirish** department **LM** is entered using. Parts of the object are selected sequentially using LM and RM is pressed (Figure 9).
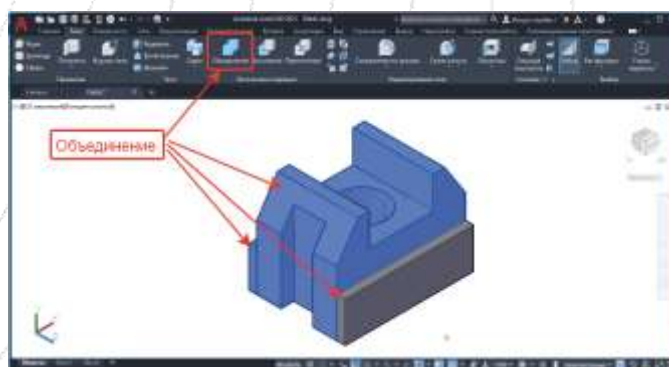
**(Figure 9).Объединение** – **merge** commandi

The clear image of the object is ready with this process. To give it the desired color, press the **LM** button twice in a row on the object. As a result, a properties window is created. Select the desired color from the Color section of the window, select **OK**, and press the Esc key (Figure 10).
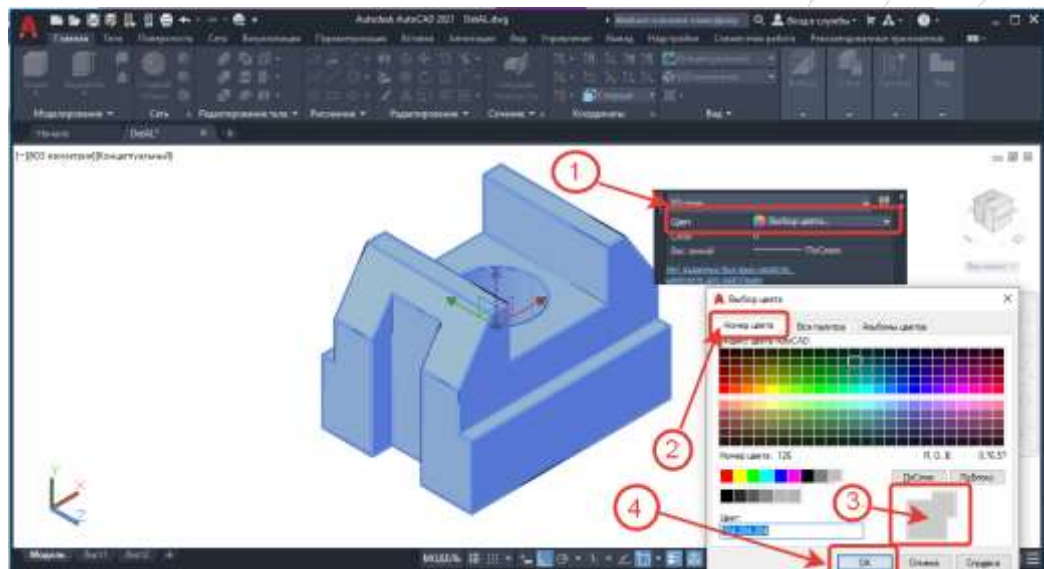
Figure 10. Coloring an object.

A clear cut image of the item.

1. After a clear image of the object is made, it is cut into quarters to give it a **Рисование** department ▢ **"Прямоугольник"**- Using the rectangle command, a rectangle is drawn that is larger than a quarter of the object and **Вытягивание** The height is drawn using the command (must be greater than the height of the object). From the **2D** frame state **Концептуальный** (Figure 11)[3].
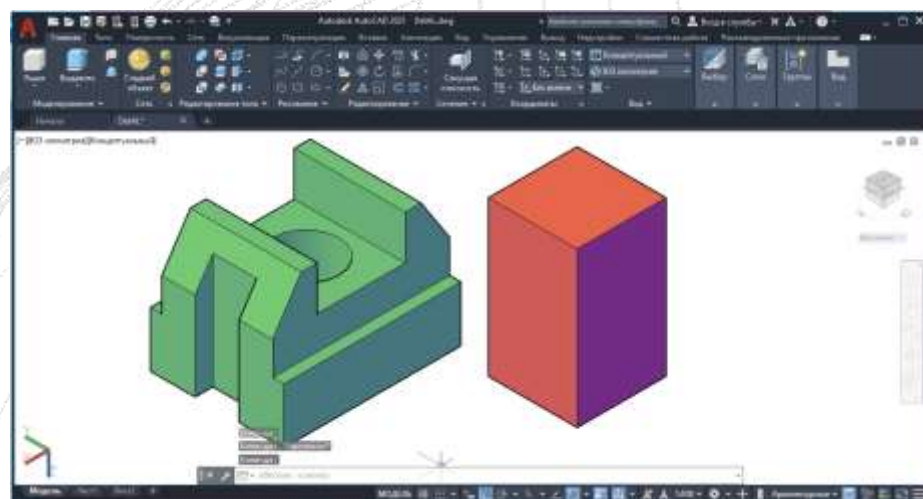
Figure 11. Giving an item a quarter cut**.**

Главная department **Редактирование** located on the panel ⬦– **перенесети** –
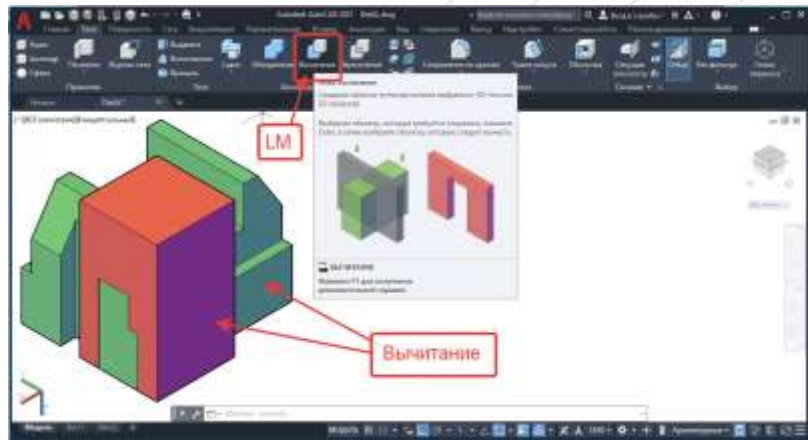The push command is specified using **LM** and a corner of the rectangular object is
selected. The object is moved to the central axis and placed (Figure 12a).
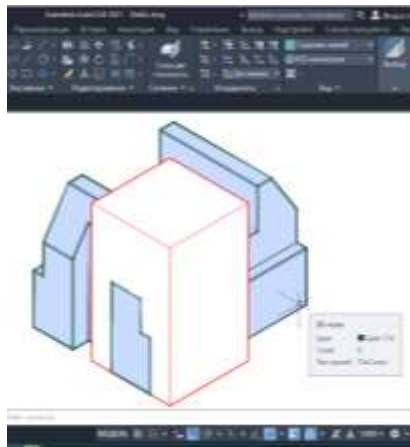
a) **Перенес**	b) **"Вычитание"**- "Separation" order

ети – push command

Figure 12. Removing a quarter of an item.

1.   After two objects are placed on top of each other, **Тело** in the department
"Вычитание"- The subtraction command is set using **LM** and the part of the object to be
retained is selected, and RM is pressed. Then the part to be deleted is selected using **LM**
and **RM** is pressed (Figure 12b)[4,5]. As a result, the object looks like this (see Figure
13!).
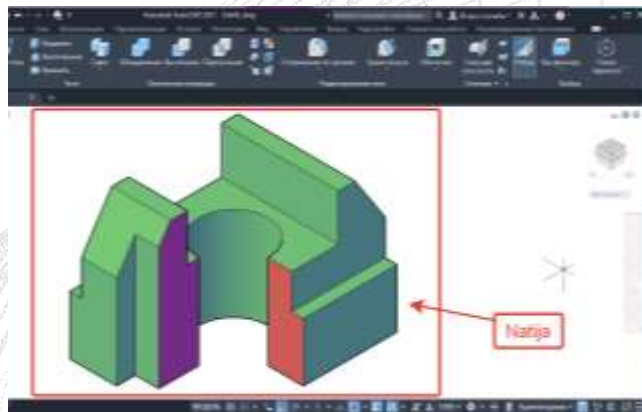
Cropping to a clear image of the item   Result
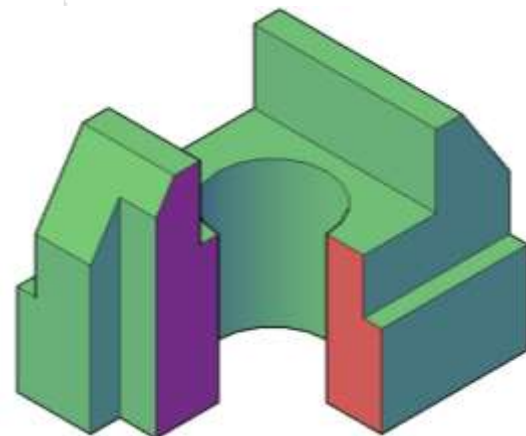
Figure 13. Quarter cropping of a clear image of an object

CONCLUSION:

Digital technology in the classroom refers to a variety of software and applications designed to assist students with special needs. The most effective way to reduce the number of repetitive, time-consuming tasks a teacher has to perform is to use technology in the classroom.

Educational technology applications can save a lot of time and energy by automating or partially automating everyday operations such as attendance tracking and performance monitoring. They teach students to use technology responsibly and strategically, which helps them make decisions and develop self-discipline. Technology in education helps prepare students for lifelong learning. These technologies provide students with the freedom to use digital knowledge in a virtual world and according to their own learning styles.

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