

COMPUTER AIDED DRAWING

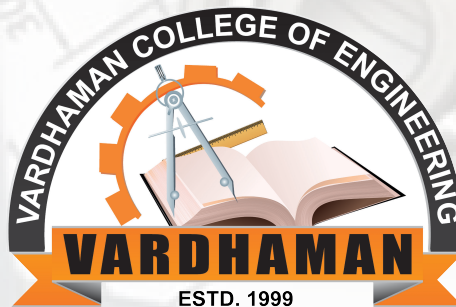
A8302

Experiment No. 1

Geometrical Modeling - I

Faculty Name:

Mr. S. Naresh Kumar



Group Name

I B.Tech I Semester

CSE

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Affiliated to JNTUH, Approved by AICTE, Accredited by NAAC with A++ Grade, ISO 9001:2015 Certified
Kacharam, Shamshabad, Hyderabad - 501218, Telangana, India

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Geometrical Constructions - I

1 Objectives

- To practice the commands to get proficiency in using AUTOCAD, a widely used computer-aided design (CAD) software.
- To gain a better understanding of fundamental geometric concepts like lines, circles, polygons, and their properties.
- To interpret and implement geometric designs based on given dimensions and specifications.
- To Develop technical skills in creating, editing, and manipulating geometric shapes and objects within AUTOCAD.
- To apply problem-solving skills to accurately replicate geometric models as per provided dimensions.

2 Introduction

Geometric modeling is a key idea in several industries, including CAD, computer graphics, manufacturing, architecture, and engineering. It entails digitally or mathematically representing real-world objects and their features, such as shape, size, and spatial relationships. Geometric modeling is required for the design, simulation, analysis, and visualization of complex objects and systems.

2.1 overview of geometric modeling

1. Types of Geometric Modeling

- (a) **2D Geometric Modeling:** This involves representing objects in two-dimensional space, typically on a flat plane. It's used for simple drawings and graphics.
- (b) **3D Geometric Modeling:** This represents objects in three-dimensional space, enabling the creation of complex 3D models for use in fields like engineering and architecture.

2. Representation Methods

- (a) **Wireframe Modeling:** It represents objects using lines and curves to define the edges and boundaries of 3D shapes.
- (b) **Surface Modeling:** In this approach, surfaces are represented by mathematical equations, splines, or other methods to create more realistic representations.

- (c) **Solid Modeling:** This is the most advanced form, where objects are represented as complete, enclosed 3D volumes, with information about both their exterior and interior.

3. Applications

- (a) **CAD (Computer-Aided Design):** Geometric modeling is at the core of CAD software, used in product design, architectural planning, and mechanical engineering.
- (b) **Computer Graphics:** In video games, animation, and visual effects, geometric modeling is used to create 3D scenes, characters, and environments.
- (c) **Simulation and Analysis:** In engineering, geometric modeling is used to simulate the behavior of physical systems, which is critical in fields such as finite element analysis.
- (d) **Manufacturing:** Geometric models are used to program computer-controlled machines (CNC machines) to produce physical objects.
- (e) **Architecture:** Architects use geometric modeling to create 3D representations of buildings and structures.

In conclusion, geometric modeling is an important idea for producing digital representations of real-world objects, allowing diverse industries to design, simulate, analyze, and visualize complicated systems and structures. It is extremely important in modern engineering, design, architecture, and computer graphics.

3 Aim

Construct the following geometric models in AUTOCAD as per the given dimensions.

4 Software Used

– AUTOCAD

5 System Requirements

- (a) **System Type:** Windows 10 64 Bit Operating System
- (b) **Processor:** i3
- (c) **RAM:** 4 GB

6 Commands Used

1. Limits
2. UCSICON

3. units
4. line
5. polyline
6. move
7. text
8. mirror
9. offset
10. layers
11. chamfer
12. dimension linear

7 Experimental procedure

1. Open the file with name *Template.dwg* from the downloads folder and edit the title block. update the details like name, roll number, class, date, title of the experiment.
2. Perform initial commands like units, ucsicon and limits.
3. In the limits set the A4 sheet dimensions 297x210.
4. Click zoom → All
5. Turn off the Grid display by pressing F7 key.
6. Switch on the object snap, ortho and object Tracking by pressing F3, F8 and F11 keys.
7. To draw a line, click Home → Draw → Line on the ribbon, or enter LINE or L in the command line.
8. Follow the prompt sequence given next.
 - (a) Specify first point:
 - (b) Specify next point or [Undo]: <Ortho on> 50
 - (c) Specify next point or [Undo]: 40
 - (d) Specify next point or [Close/Undo]: 10
 - (e) Specify next point or [Close/Undo]: 20
 - (f) Specify next point or [Close/Undo]: 15
 - (g) Specify next point or [Close/Undo]: 40
 - (h) Specify next point or [Close/Undo]: 25

- (i) Specify next point or [Close/Undo]: *Cancel*
- 9. Command: MI (MIRROR)
 - (a) Select objects: Specify opposite corner: 7 found
 - (b) Specify first point of mirror line:
 - (c) Specify second point of mirror line:
 - (d) Erase source objects? [Yes/No] <No>
- 10. using dimension linear command give the dimensions as per the drawing
- 11. Save the file in local disk D or E in the following path D:23881A0501/experiment 1.

8 Result

The geometric models are analyzed and drawn in the AUTOCAD.

9 Outcomes

- Successfully created the geometric models as specified in the given dimensions and instructions.
- Able to demonstrate the ability to interpret and apply dimensional information in a CAD environment.
- Able to develop problem-solving skills by resolving challenges that may arise during the construction of geometric models.
- Able to document the work effectively, including annotations, dimensions, and relevant notes within the AUTOCAD environment.
- Able to present completed models to peers or instructors, fostering communication and presentation skills.

10 Models

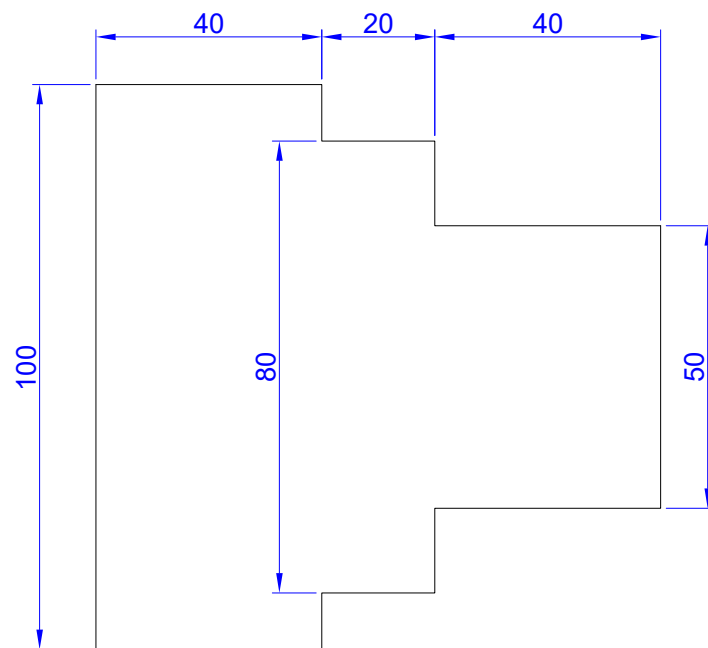


Fig. 1

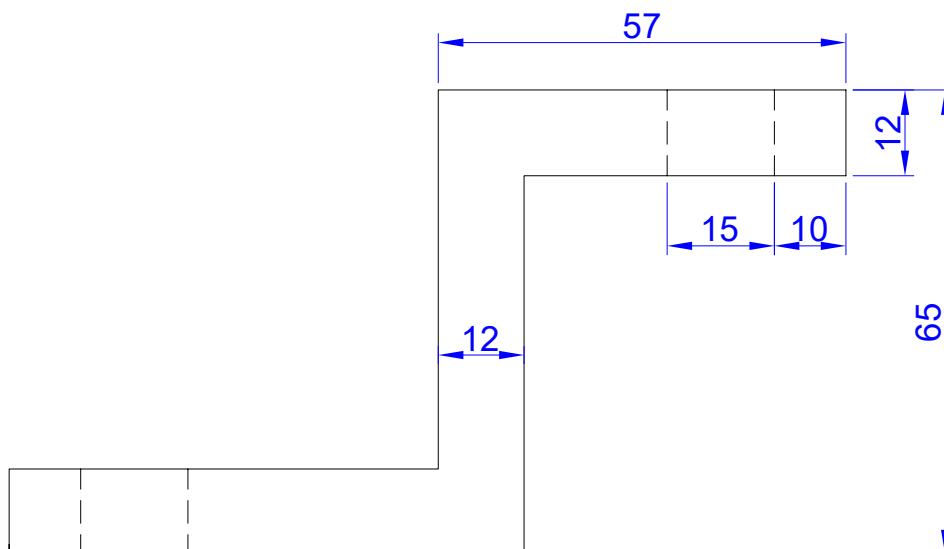


Fig. 2

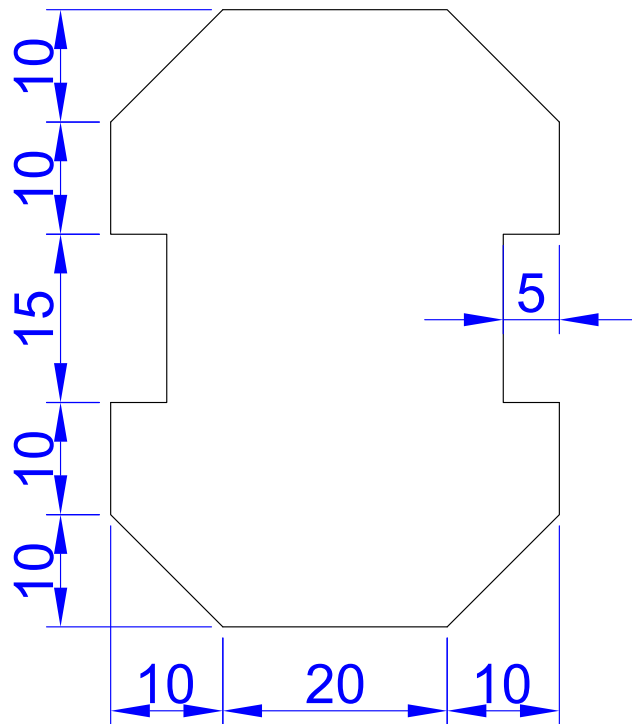


Fig. 3

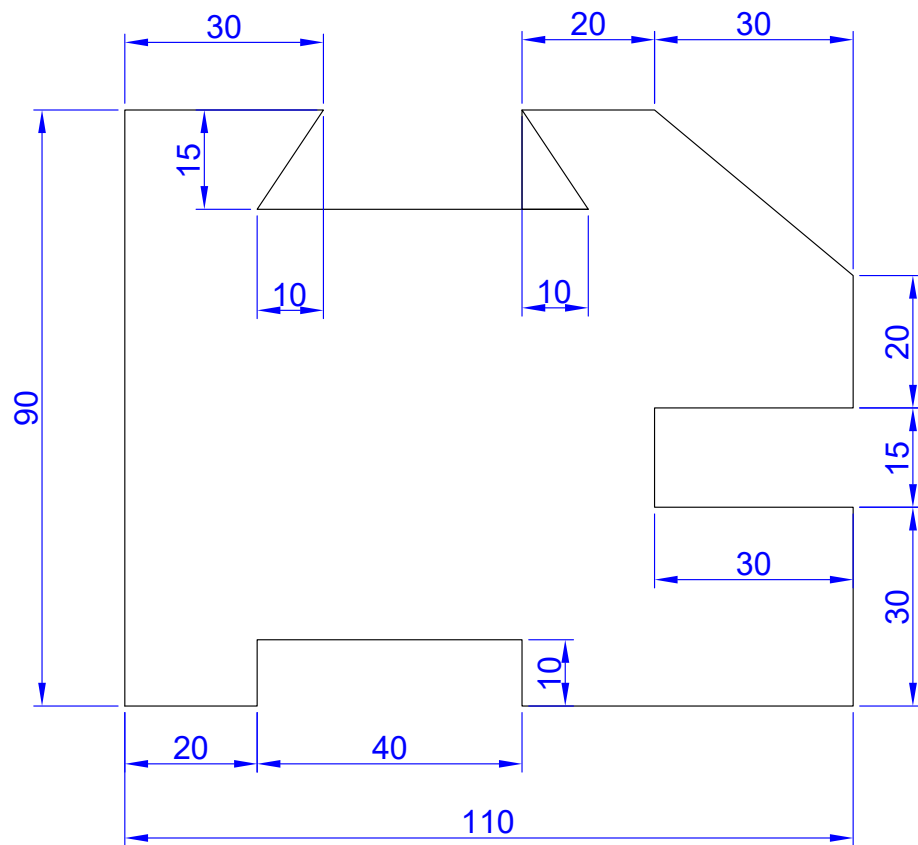


Fig. 4