

Information Booklet cum Syllabus

Of

AutoCAD

Revision-I



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National Institute of Electronics and Information Technology

An Autonomous Scientific Society under
Ministry of Electronics and Information Technology, Government of India

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1. **About the Course**

Computer Aided Design (CAD) is the most powerful tool in design and manufacturing industries with its reliability, flexibility, efficient and cost effectiveness. With the CAD one can easily visualize and see the final product at the design stage itself with the aid of computer. The final product can be modified easily according to the need of application. AutoCAD is one of the most popular and powerful CAD packages available on PC platforms and also a general purpose CAD program for Part and Assembly Models. One can customize the powerful drawing tool to suit their specific application. This makes it essential for engineers to get an exposure to AutoCAD package.

2. **NIELIT**

National Institute of Electronics and Information Technology, NIELIT, (Erstwhile DOEACC Society) is an autonomous scientific society of the Ministry of Electronics & Information Technology, Government of India. The Society is registered under the Societies Registration Act, 1860. NIELIT was set up to carry out Human Resource Development and related activities in the area of Information, Electronics & Communications Technology (IECT). NIELIT is engaged both in Formal & Non-Formal Education in the areas of IECT besides development of industry oriented quality education and training programmes in the state-of-the-art areas. NIELIT has endeavored to establish standards to be the country's premier institution for Examination and Certification in the field of IECT. It is also one of the National Examination Body, which accredits institutes/organizations for conducting courses in IT and Electronics in the non-formal sector.

3. **Objective of Course**

The course is aimed at giving exposure to and enhancing the knowledge and skills of engineers involved in CAD packages and for those who want to provide training to others in this area. It gives exposure and on hand experience in the field of CAD, Part modeling, Assembly Modeling and Detailing.

After completing this Course, the learner will be able to:

- Understanding the AutoCAD workspace and user interface.
- Using basic drawing, editing, and viewing tools.
- Organizing drawing objects on layers.
- Inserting reusable symbols (blocks).
- Adding text, hatching, and dimensions.
- Navigate throughout AutoCAD using major navigating tools.
- Explain drawing using annotations.
- Plot or print the drawing by scale.
- Understand concepts 3D Modeling: Concepts, Wireframe, Surface, and Solid Modeling

4. Job Roles of Course

After successful completion of the qualification the candidates shall be employed in the industries for following occupations:

- Automotive
- Defense
- Aerospace
- Civil Construction
- Structural
- Mechanical CAD
- Electrical CAD

5. Eligibility

10+2 with basic knowledge of Computers / ITI /Diploma of any of these.

6. Total duration of the Course

80 Hours (Theory: 30 Hrs, Practical/Tutorial: 50 Hrs)

7. Course Details

7.1.Course Outline and Objective of Each Unit

S. No.	Unit Name	Duration (Theory) in Hours	Duration (Practical) in Hours	Total Learning Hrs.	Learning Objectives
1	Unit1 - Introduction To AutoCAD	5	8	13	After completion of this Unit, the candidate will be able to : <ul style="list-style-type: none">• Understand about AutoCAD Versions• Understand about the working of different Function Keys.• Understand about the different types of Coordinate system
2	Unit 2 - Draw and Modify commands	5	8	13	After learning this Unit the participant will be able to <ul style="list-style-type: none">• Understand about Draw Commands, Modify Commands• Learn about how to change Dimension Style

3	Unit3 – Text command, Layers, blocks	5	8	13	After completion of this Unit the participants will be able to <ul style="list-style-type: none"> • Write Text Messages • Understand about Layers and Blocks
4	Unit4 - Isometric views	5	8	13	After attending this Unit the participants will be able to <ul style="list-style-type: none"> • Learn about the basics of 2D Fundamentals • Isometric Views and Diagrams • Mechanical Drawing
5	Unit5 - Introduction to 3D Interface	5	8	13	After attending this Unit the participants will be able to <ul style="list-style-type: none"> • Learn about the basics of 3D Interface • 3D Modeling
6	Unit-6 Project	5	10	15	After completion of the project students will <ul style="list-style-type: none"> • Able to create a design which will help to solve any real life design problem in Civil and Mechanical Areas.
	Total	30	50	80	

7.2.Detailed Syllabus

Unit Name	Contents	Hrs.
Unit1 – Introduction To AutoCAD	1.1 Introduction of AutoCAD, 1.2 AutoCAD versions Interface, 1.3 Control the Drawing, 1.4 Function keys AutoCAD basics, 1.5 Cartesian coordinate system, Absolute Coordinate System, Relative Coordinate System	13
Unit 2 - Draw and Modify commands	2.1 Draw Commands-Line command, Poly line command, Rectangle command,	13

	<p>2.2 Modify commands- Move ,Rotate, Scale, copy, Mirror, erase, trim, extend,</p> <p>2.3 Annotate Dimension Style Manager Linear, Aligned, Radius Angular, Arc length</p>	
Unit3 – Text command, Layers, blocks	<p>3.1 Text command- Single line text, Multiline text</p> <p>3.2 Layers, Layer properties,</p> <p>3.3 Blocks, Insert blocks, Parametric Geometric, Dimensional Manage</p>	13
Unit4 – Isometric views	<p>4.1 Isometric views- Isometric top, left, right</p> <p>4.2 Isometric diagrams, Isometric drawings, Isometric diagrams exercise,</p> <p>4.3 2D Fundamentals, Drawing units, Sheet settings</p> <p>4.4 Mechanical diagrams</p>	13
Unit5 - Introduction to 3D Interface	<p>5.1 Introduction to 3D Interface</p> <p>5.2 AutoCAD workspaces</p> <p>5.3 Mechanical 3D Modeling</p>	13
Unit-6 Project	<p>6.1 Project based on following Areas:</p> <ul style="list-style-type: none"> • Mechanical • Civil 	15

Figure 2. Note the figure is start from the point (10, 10).

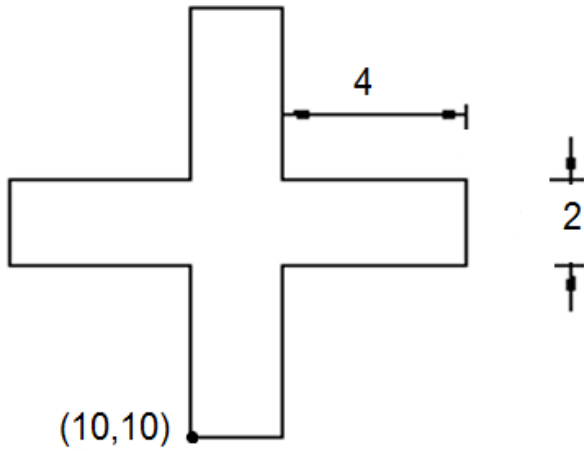


Figure 3. Note the figure is start from the point (5,5).

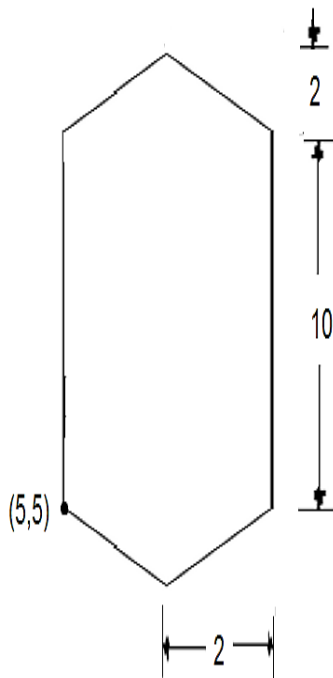


Figure 4. Note the figure is start from original point (0,0) and the angle between sides is 45 degree.

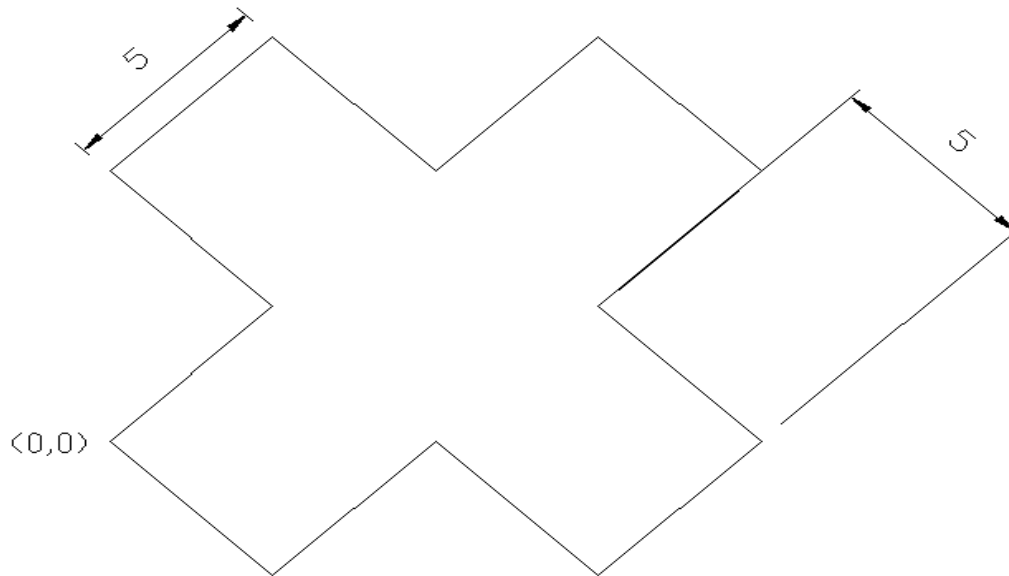


Figure 5. Note the figure is start from original point (0,0).

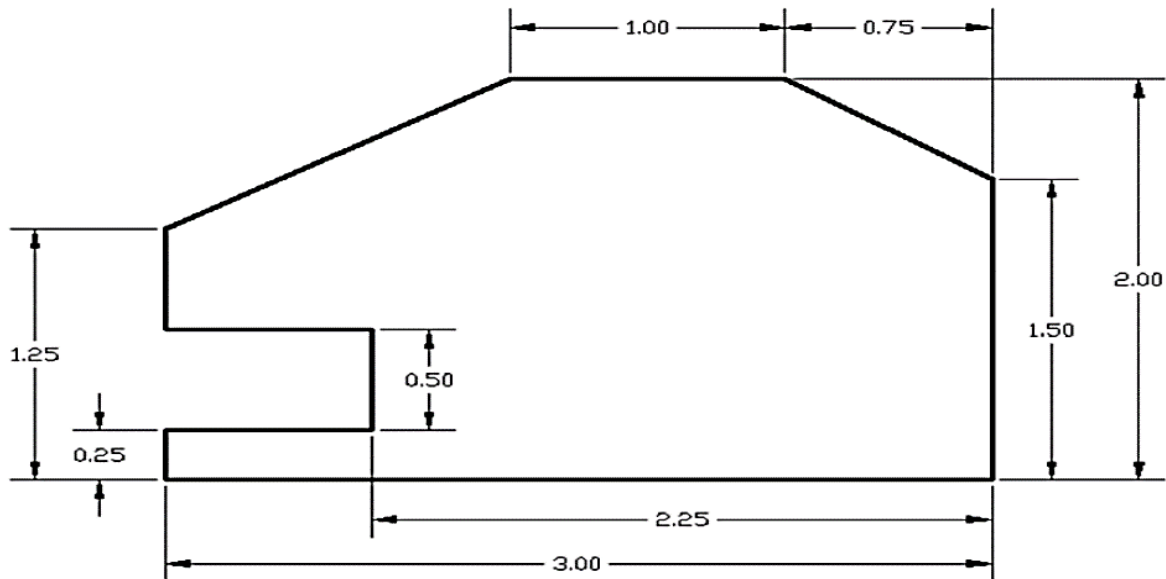


Figure 6. Note the figure is start from the point (1.75,0).

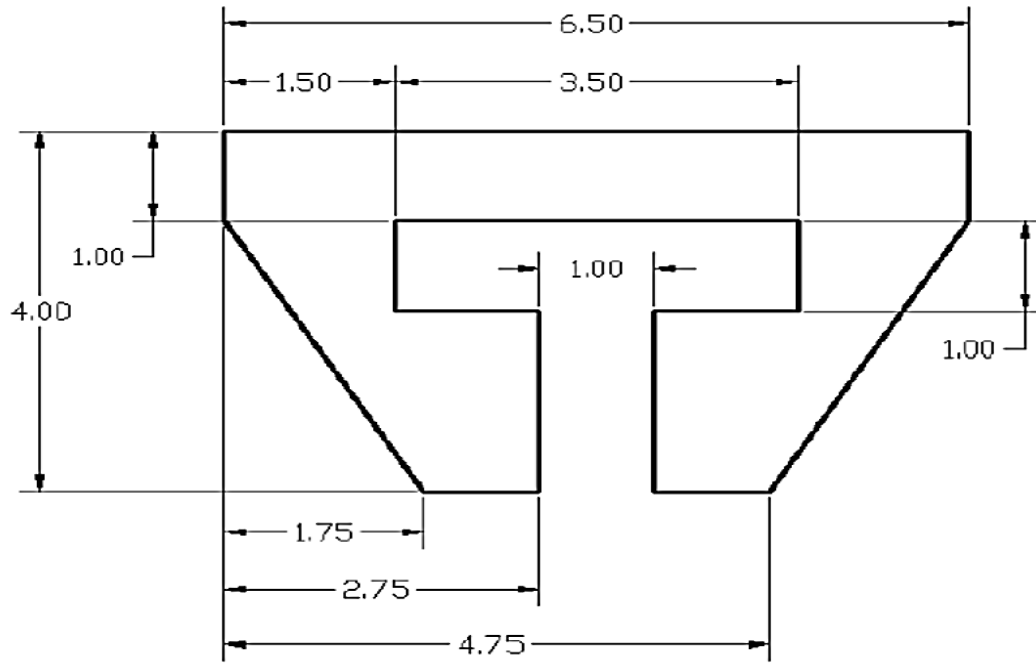
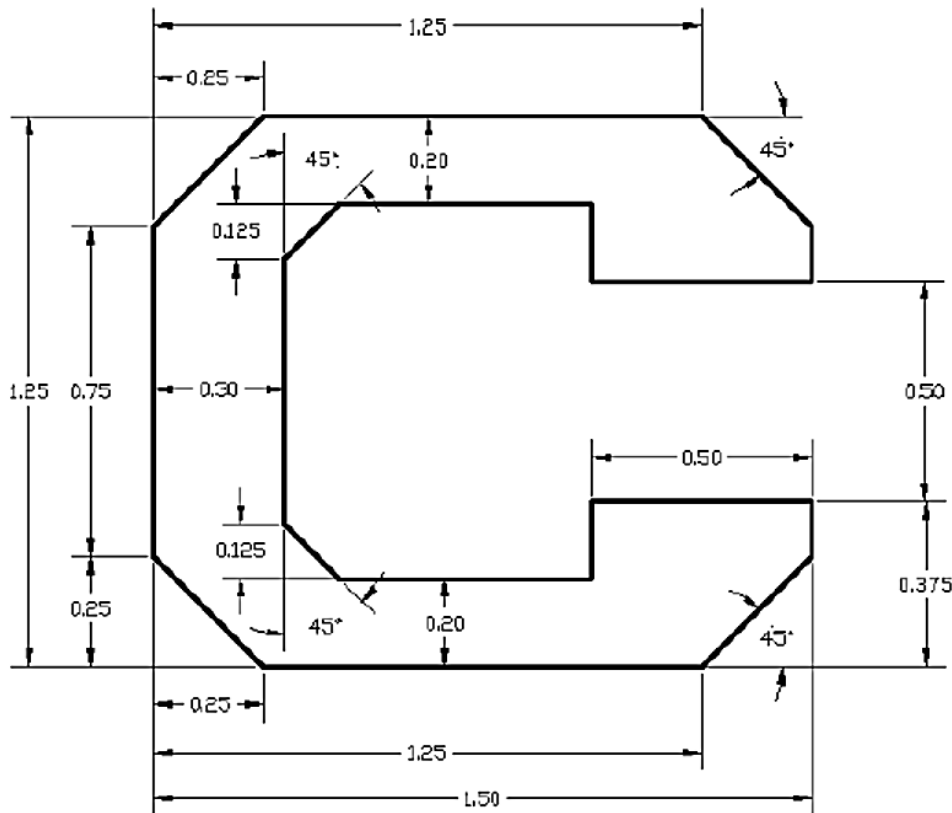


Figure 7. Note the figure is start from the point (0.25,0).



Assignment-2

Draw the following figures (Cartesian / Polar Coordinate System)
(a) Absolute Coordinate System (b) Relative Coordinate System
using RECTANGLE Command

Figure 1. Note the figure is start from the point (1,1).

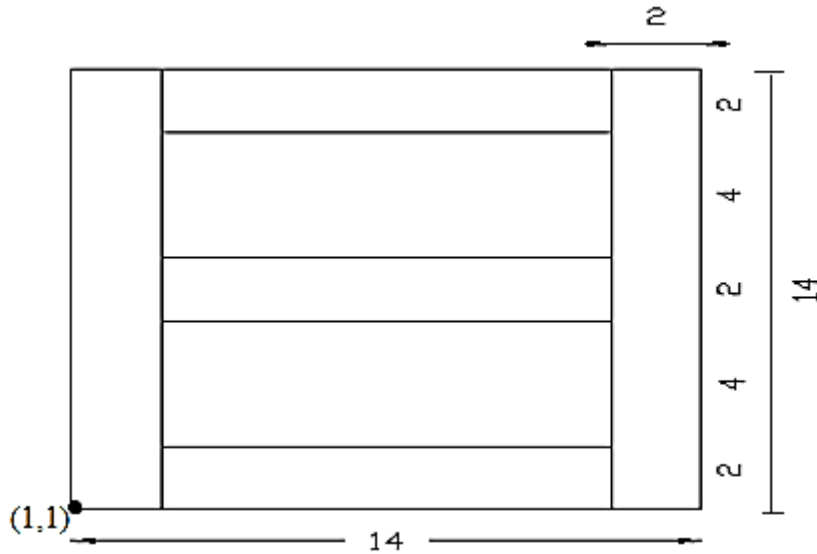


Figure 2. Note the figure is start from the point (1,1).

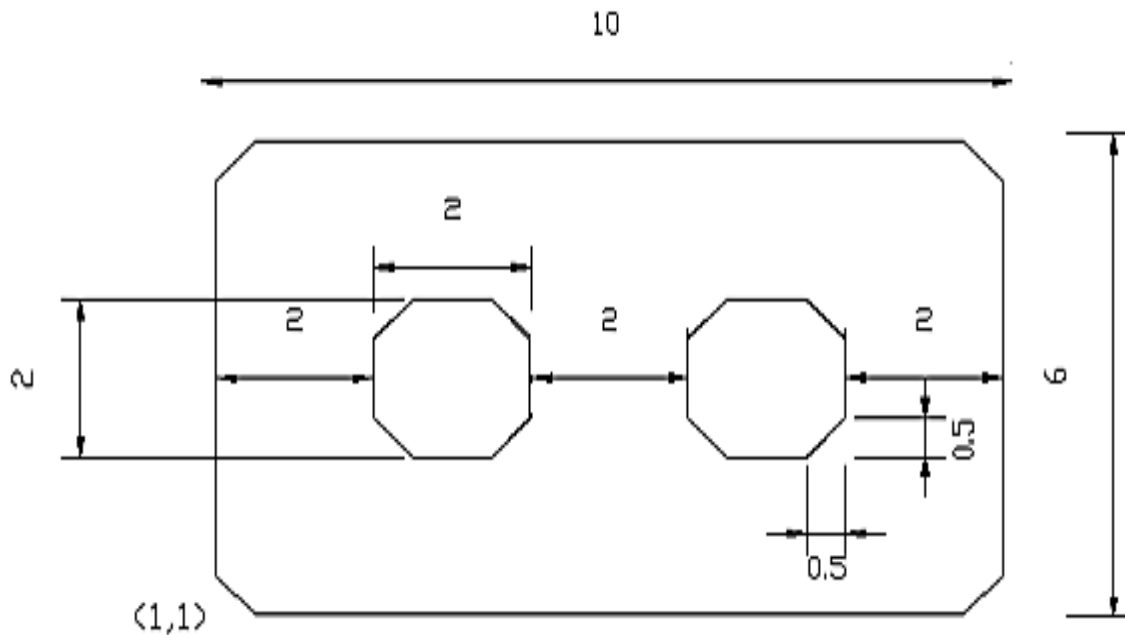
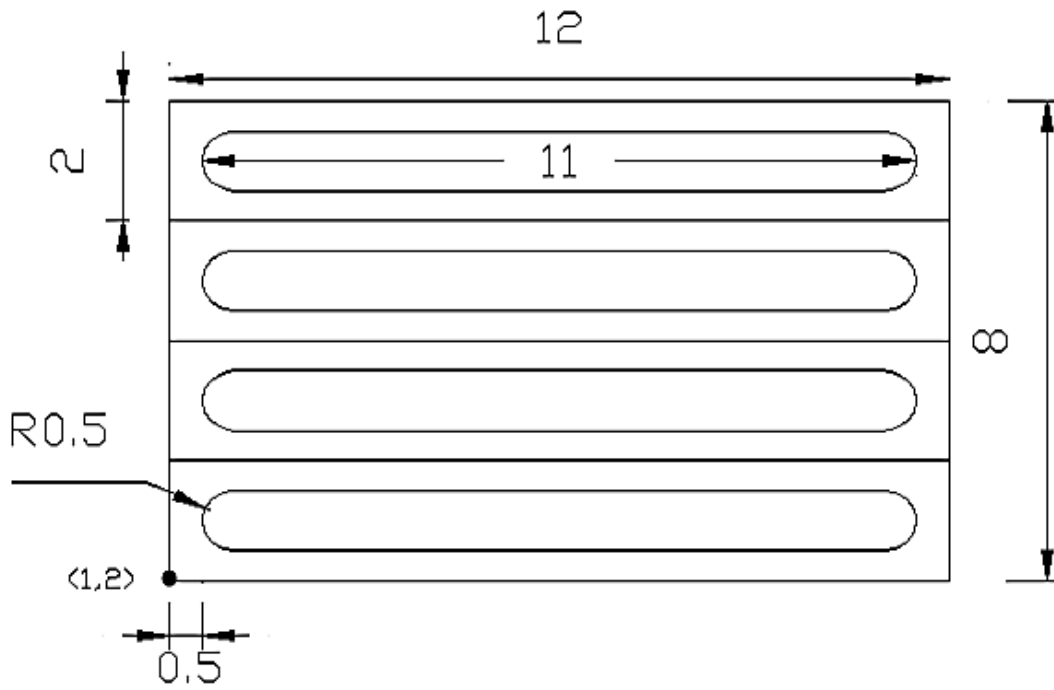


Figure 3. Note the figure is start from the point (1,2).



Assignment-3

Draw the following figures (Cartesian / Polar Coordinate System)

**(a) Absolute Coordinate System (b) Relative Coordinate System
using CIRCLE Command**

Figure 1. Note the figure is start from the Centre point (0,0).

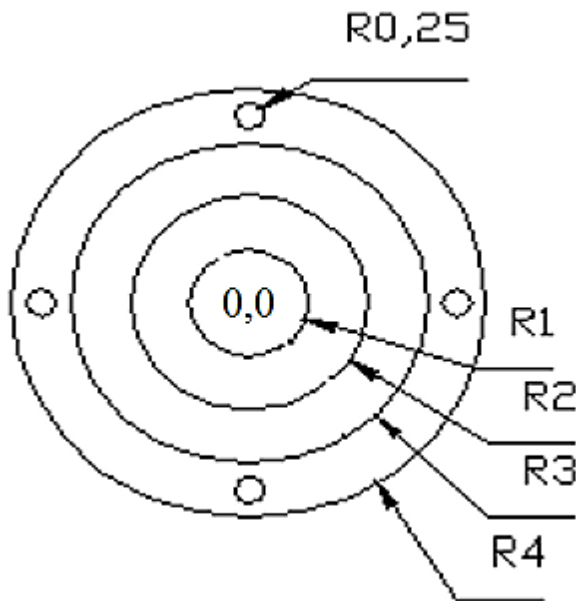


Figure 2. Note the figure is start from the point (20,10).

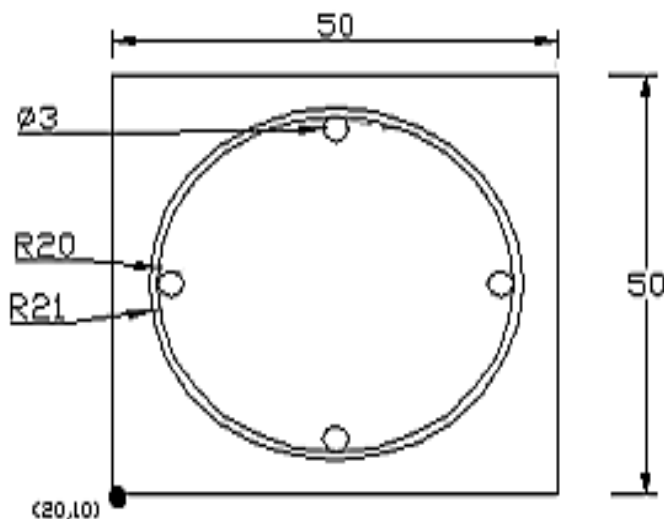


Figure 3. Note the figure is start from the point (10,20).

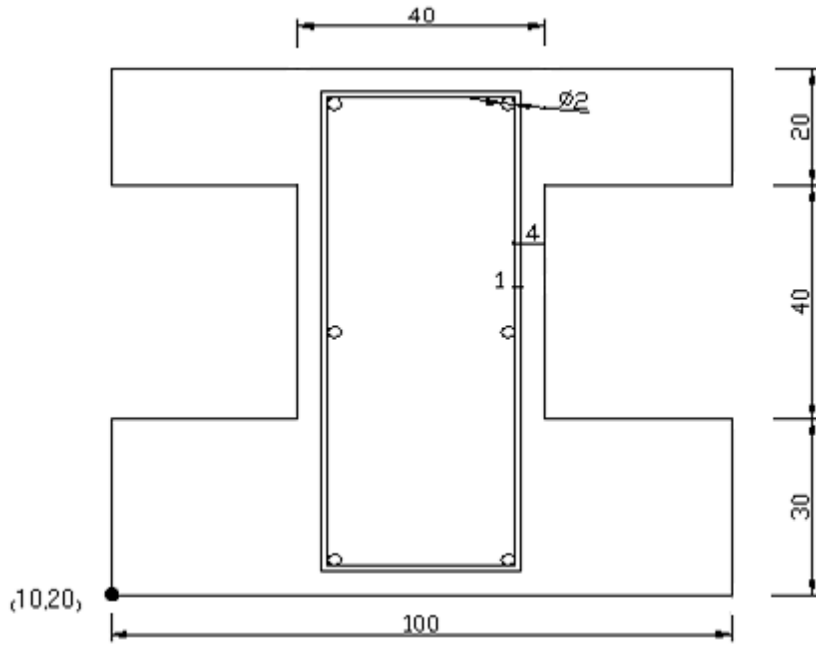


Figure 4. Note the figure is start from the point (0,0).

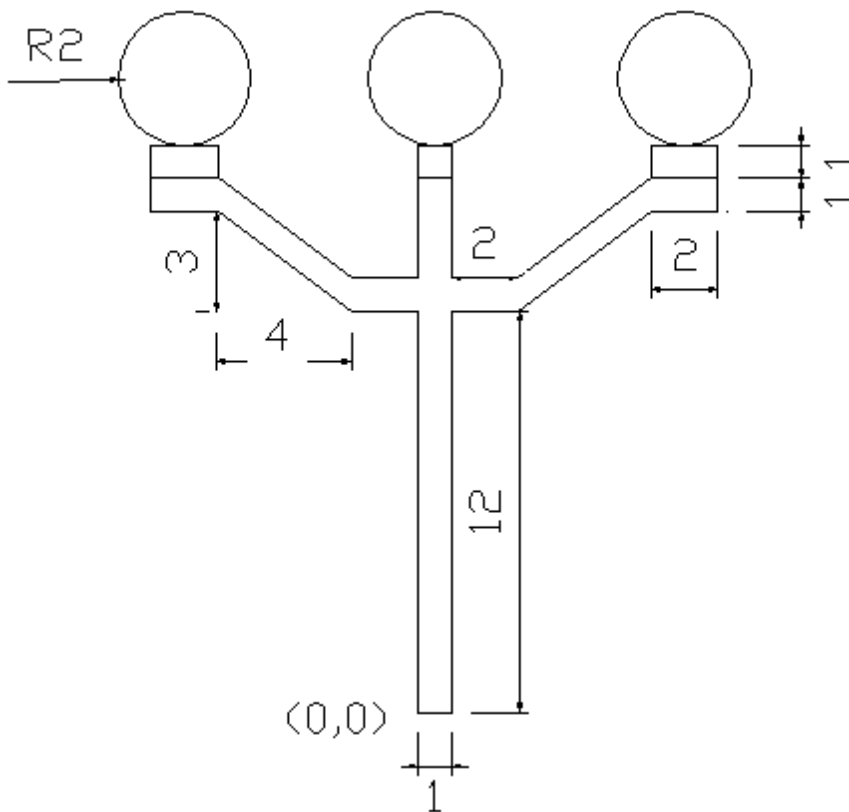


Figure 5. Note the figure is start from the point (100,100).

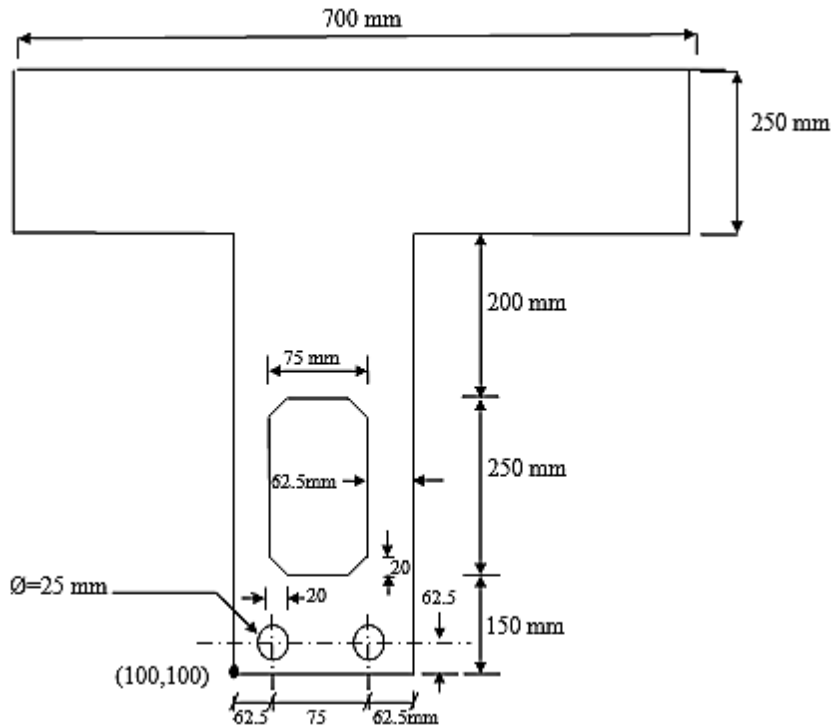


Figure 6. Note the figure is start from the point (100,100).

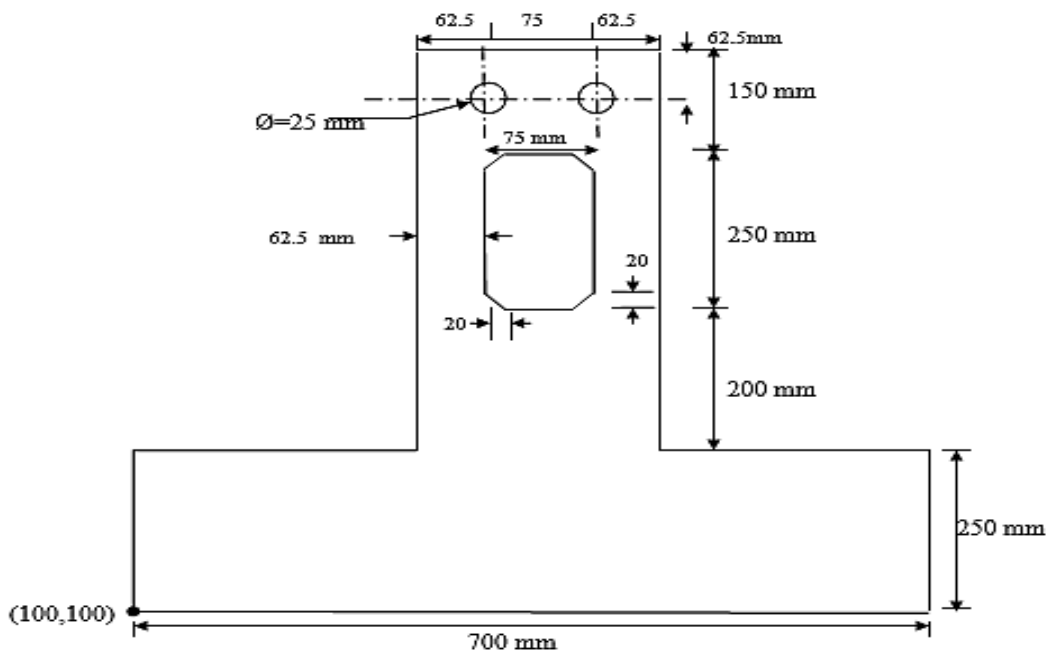


Figure 7. Note the figure is start from the point (10,20).

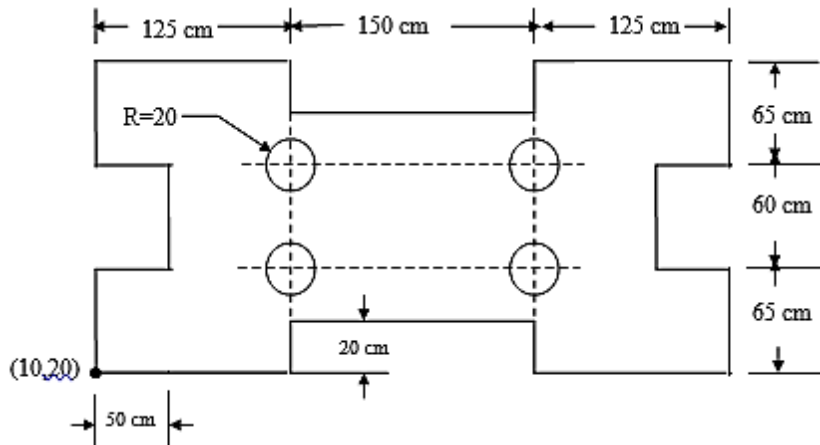
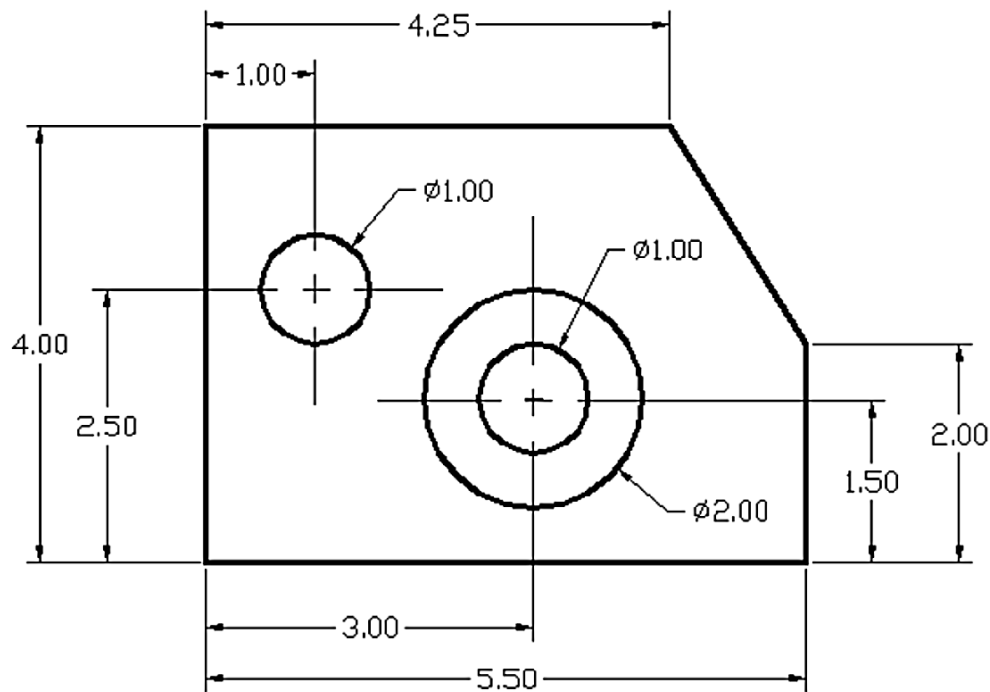


Figure 8. Note the figure is start from the point (0,0).



Assignment-4

Draw the following figures (Cartesian / Polar Coordinate System)

**(a) Absolute Coordinate System (b) Relative Coordinate System
using ARC Command**

Figure 1. Note the figure is start from the point (1,1).

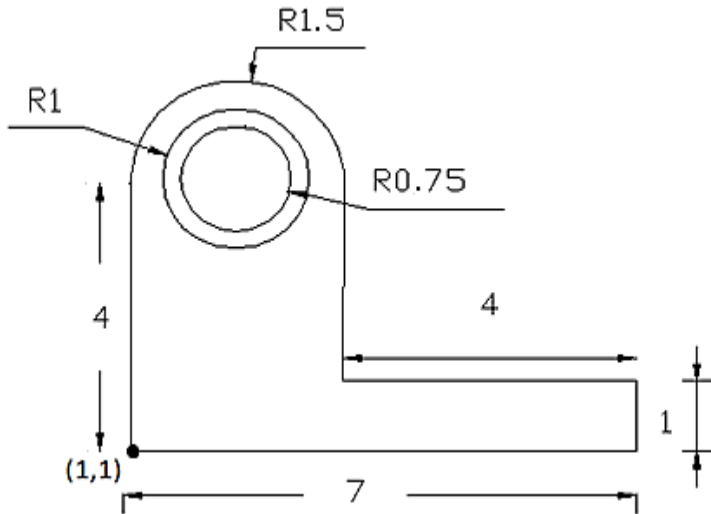


Figure 2. Note the figure is start from the point (5,3).

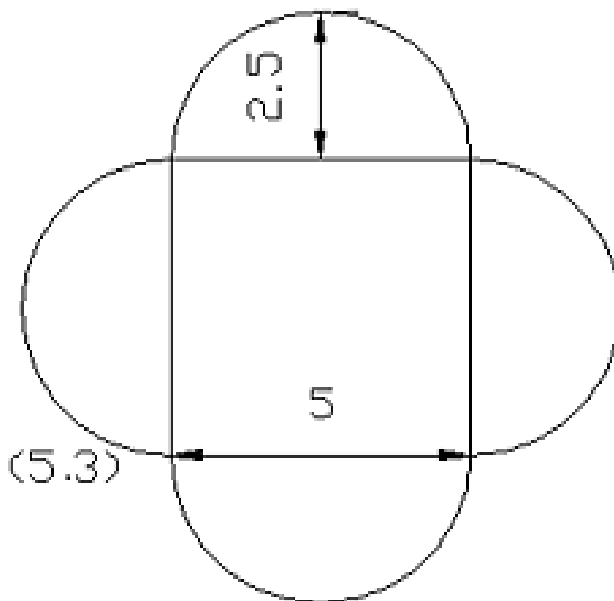


Figure 3. Note the figure is start from the point (10,10).

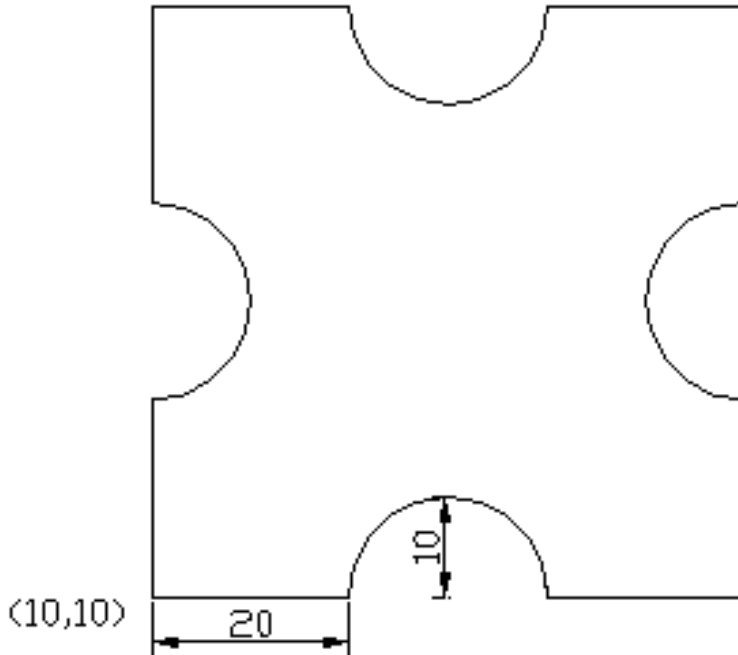


Figure 4. Note the figure is start from the point (0,0).

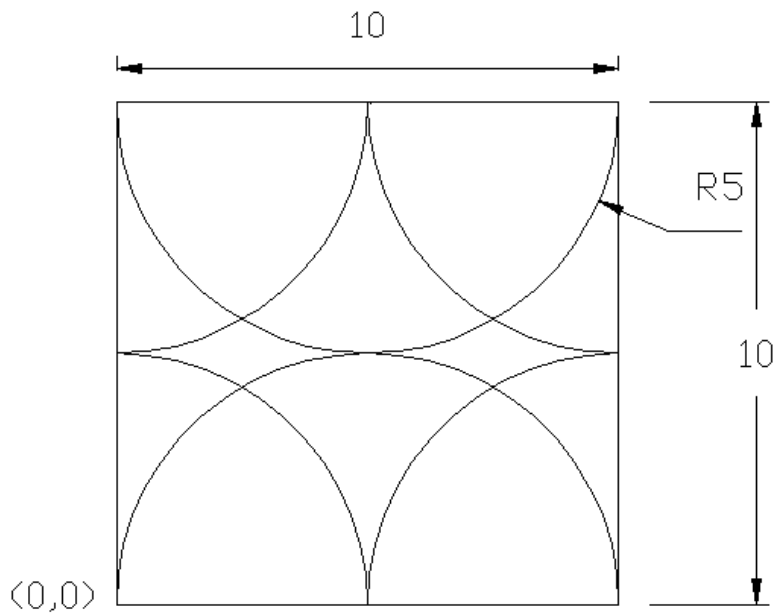


Figure 5. Note the figure is start from the point (0,0).

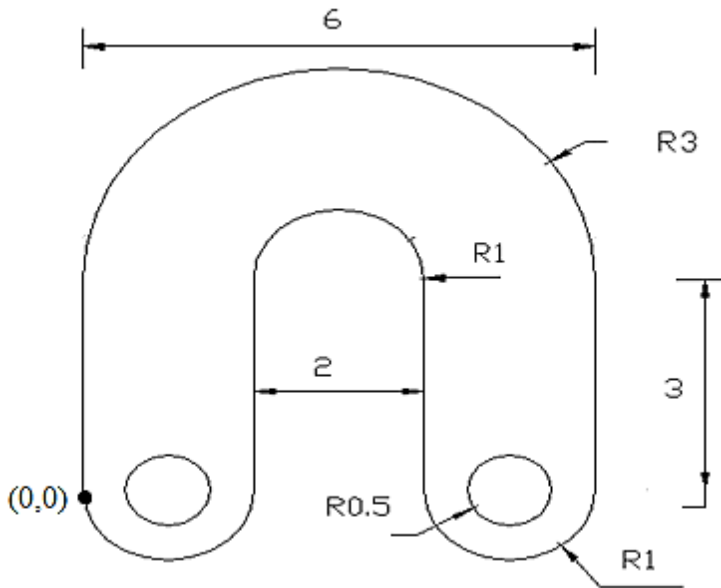
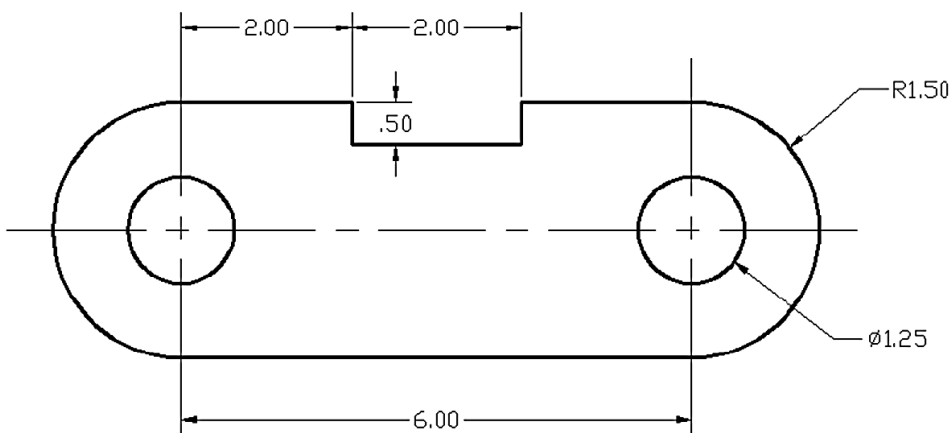


Figure 6. Note the figure is start from the point (0,0).



Unit-2

Assignment-1

Draw the following figures using ELLIPSE Command

Figure 1. Note the figure is start from the point (10,10).

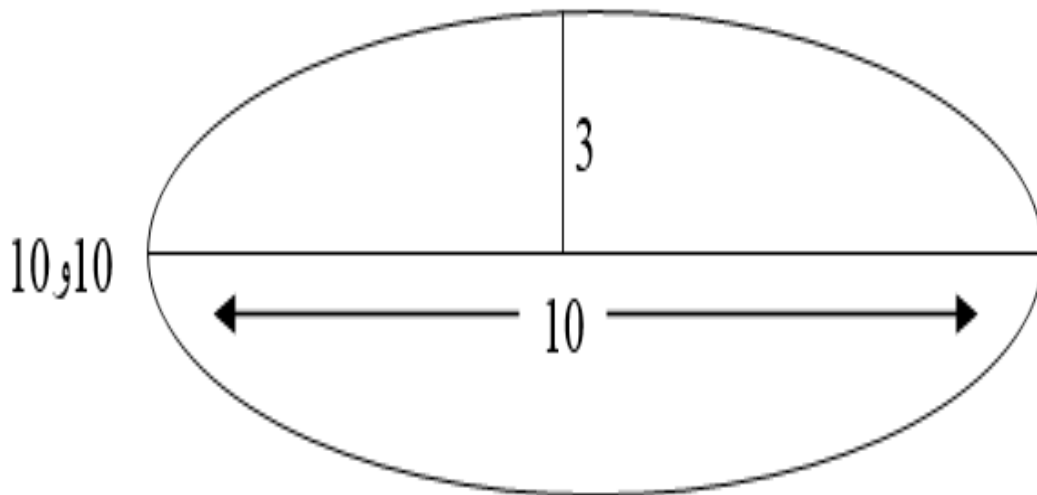


Figure 2. Note the figure is start from the point (5,5).

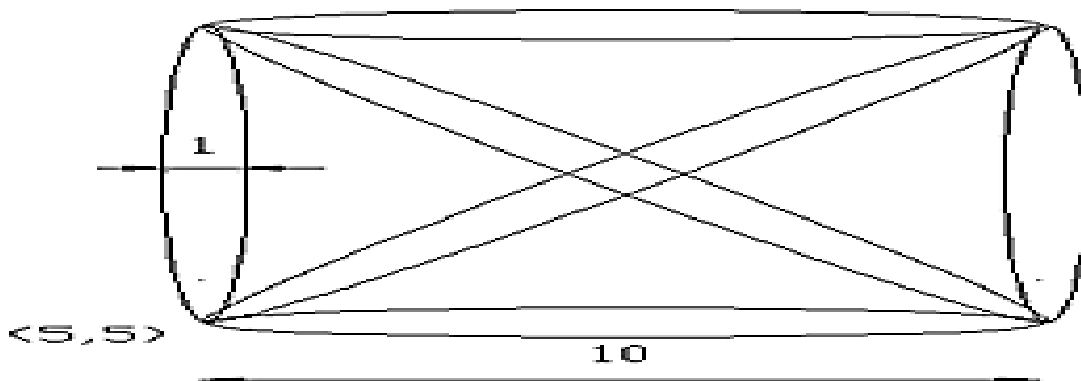


Figure 3. Note the figure is start from the point (0,0).

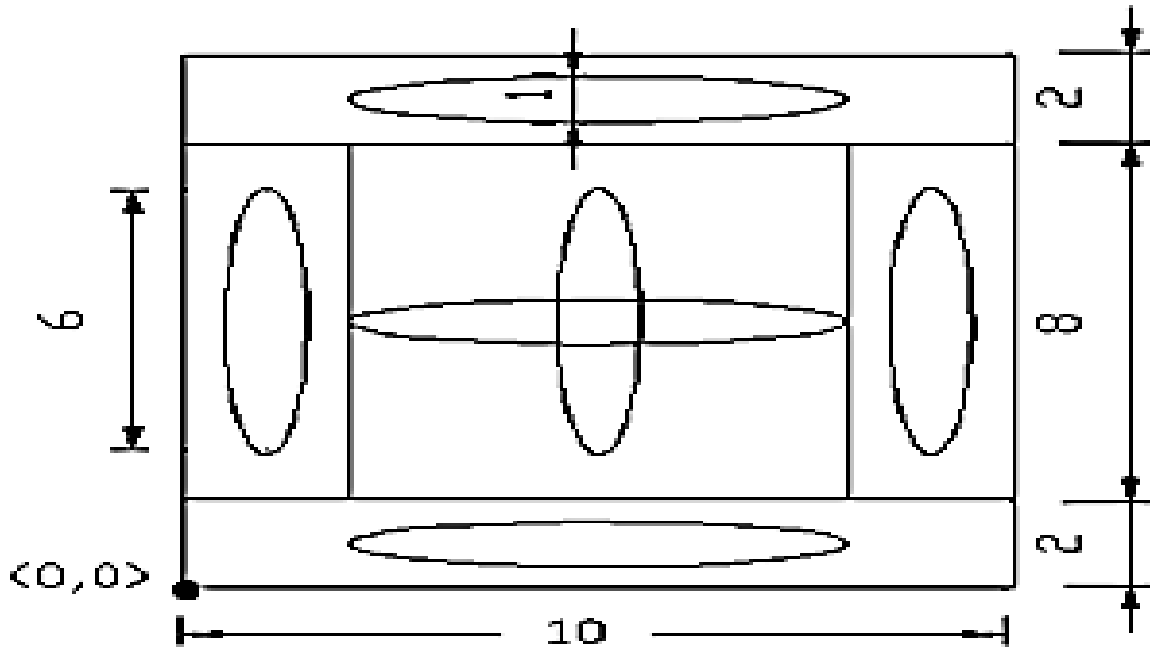
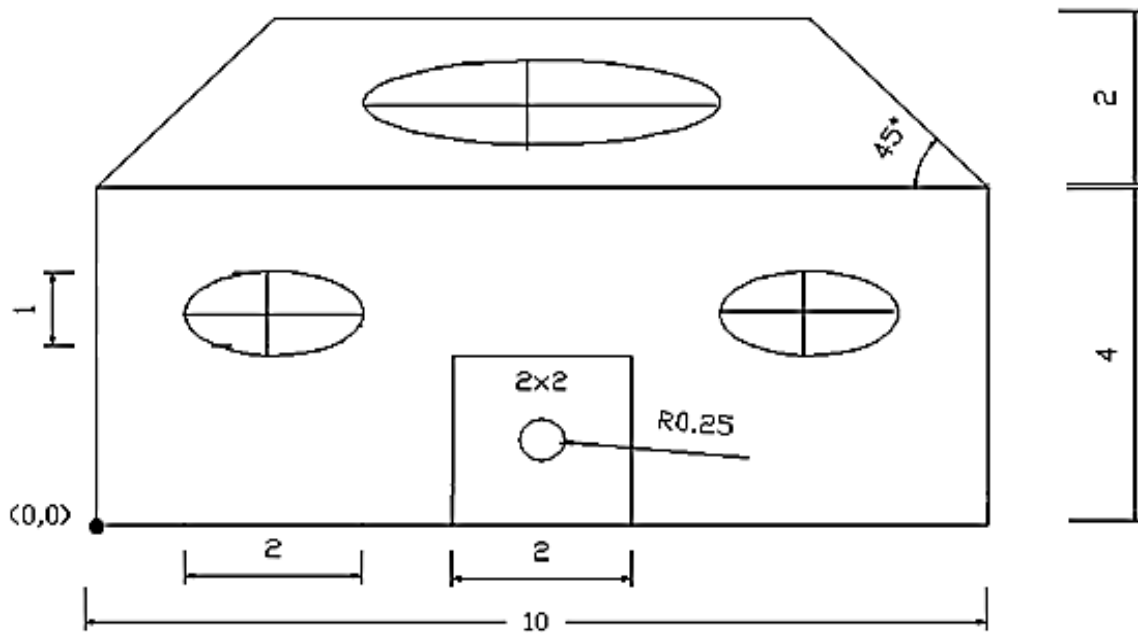
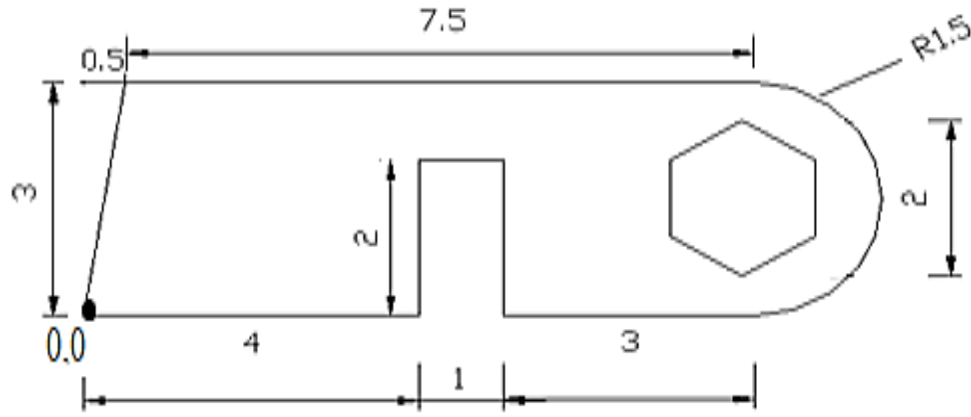


Figure 4. Note the figure is start from the point (0,0).



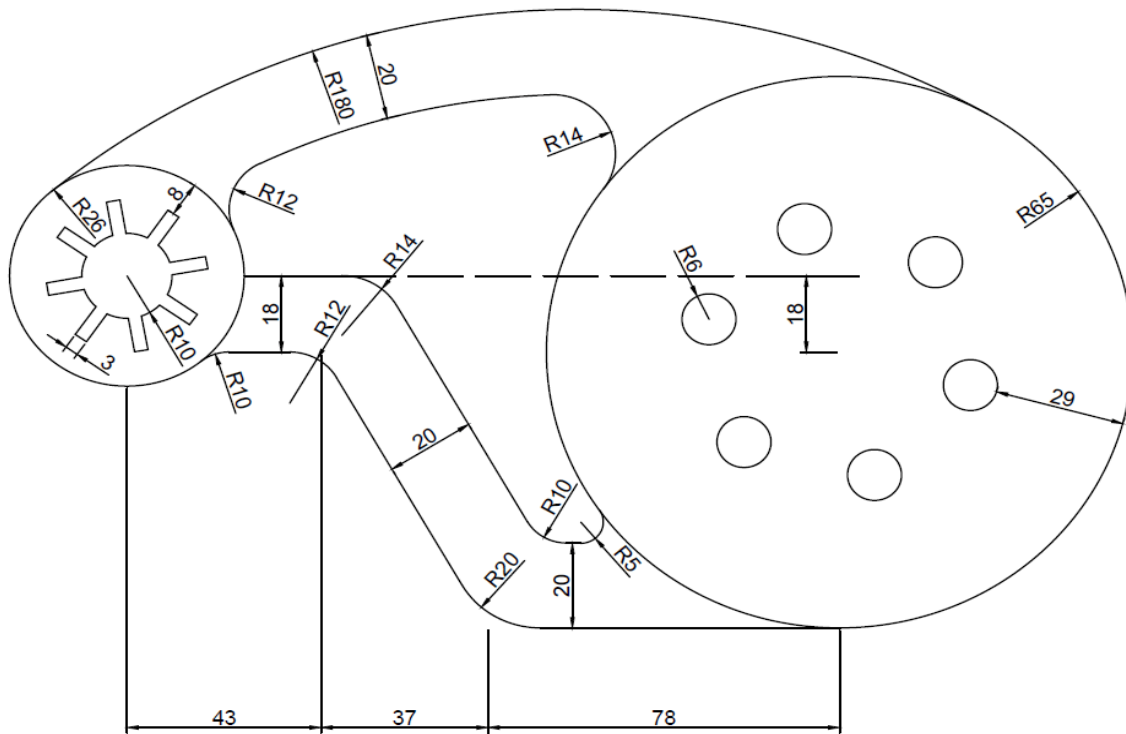
Assignment-2

Draw the following figures using POLYGON Command from the point (0,0).



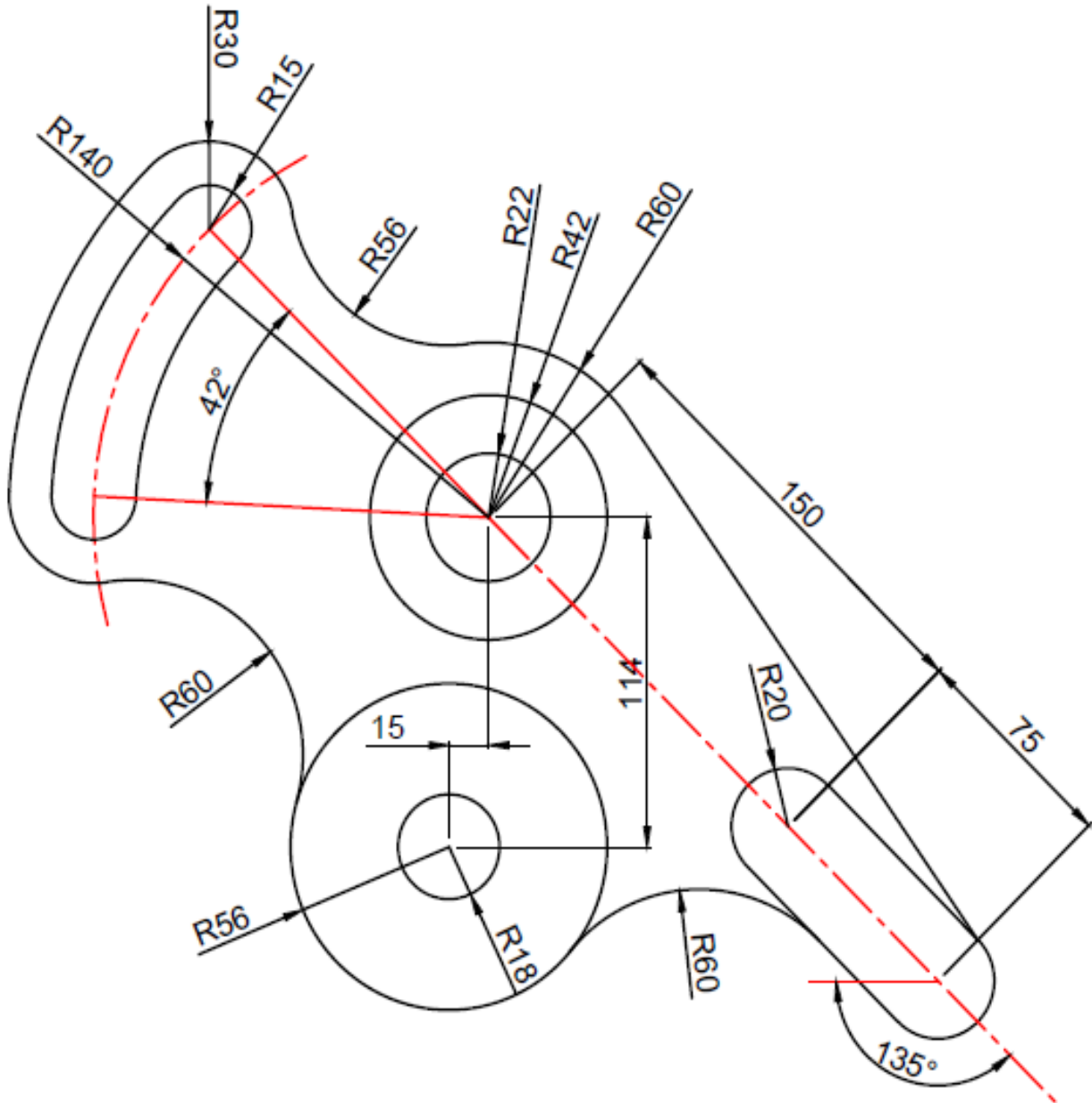
Assignment-3

Draw the following 2D diagram with the given dimensions.



Assignment-4

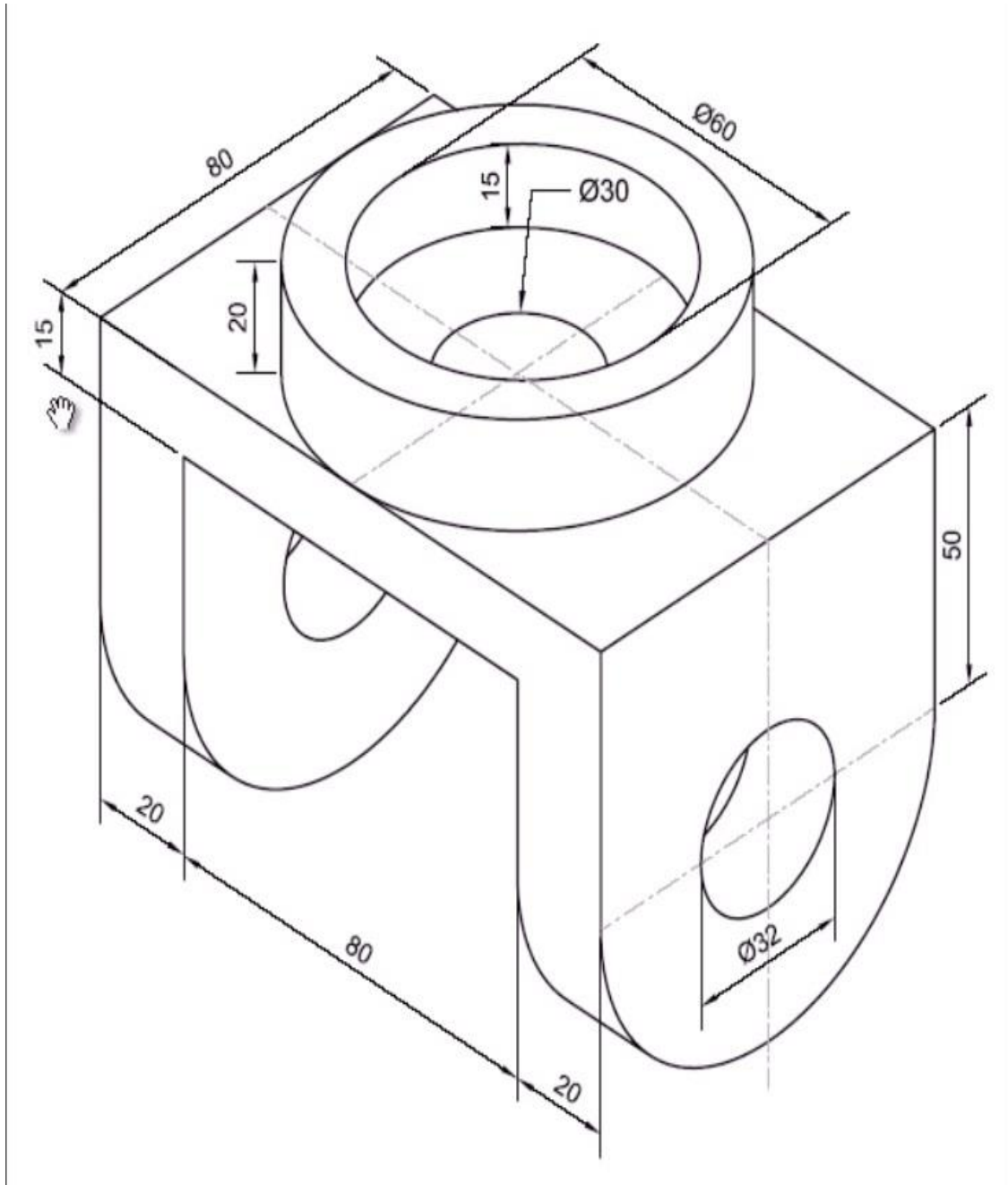
Draw the following 2D diagram with the given dimensions.



Unit-3

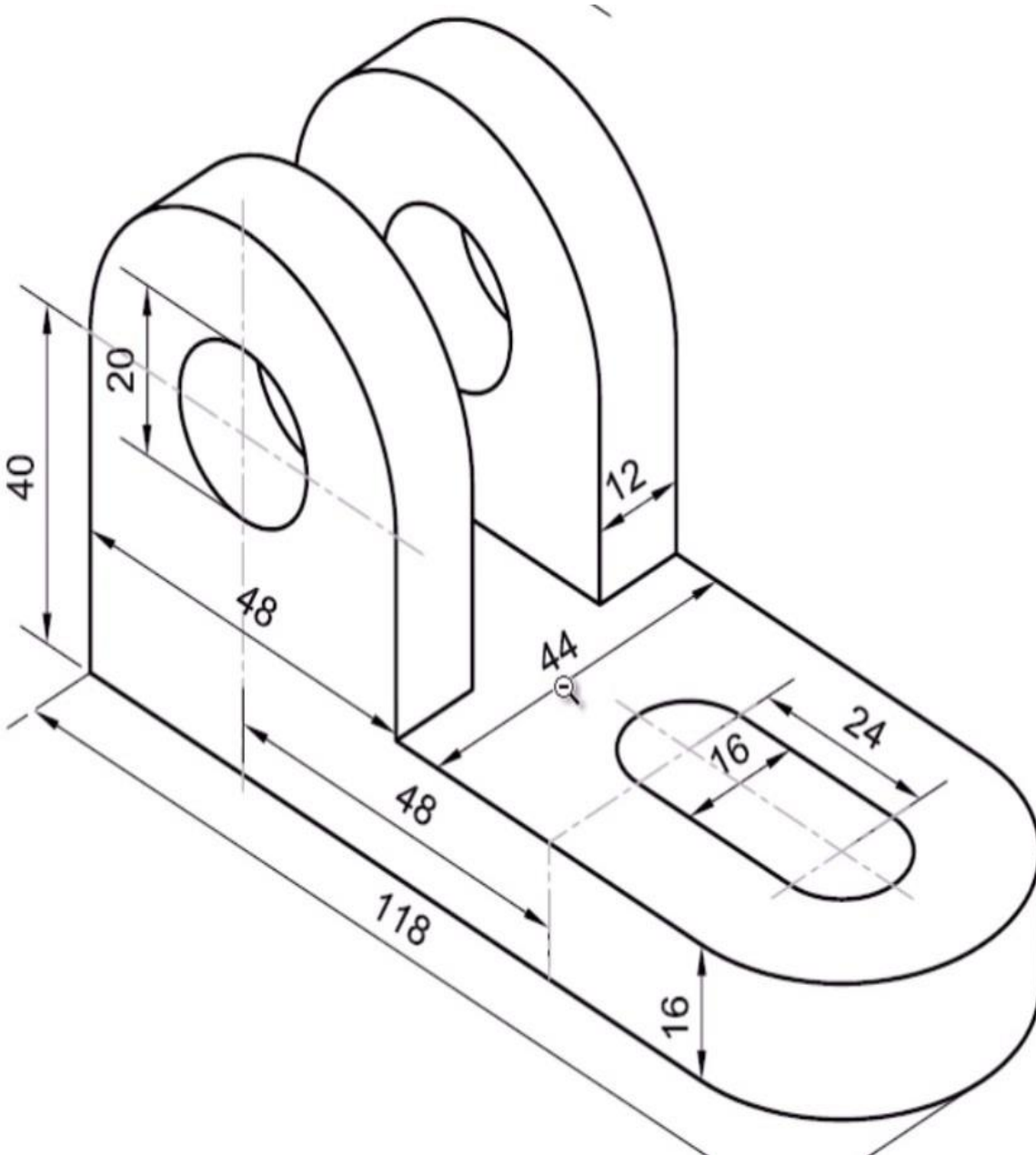
Assignment-1

Draw the following 3D diagram with the given dimensions.



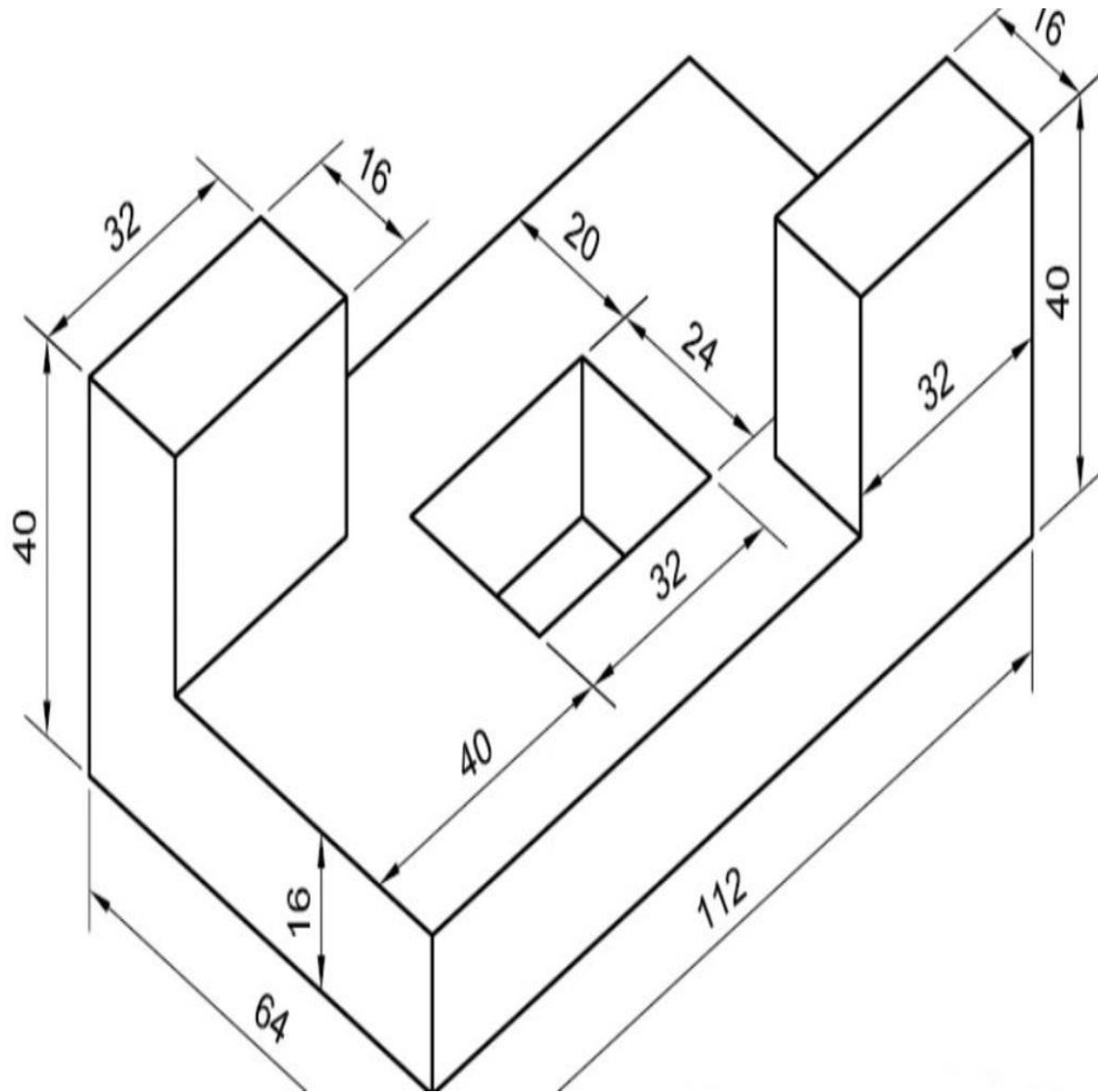
Assignment-2

Draw the following 3D diagram with the given dimensions.



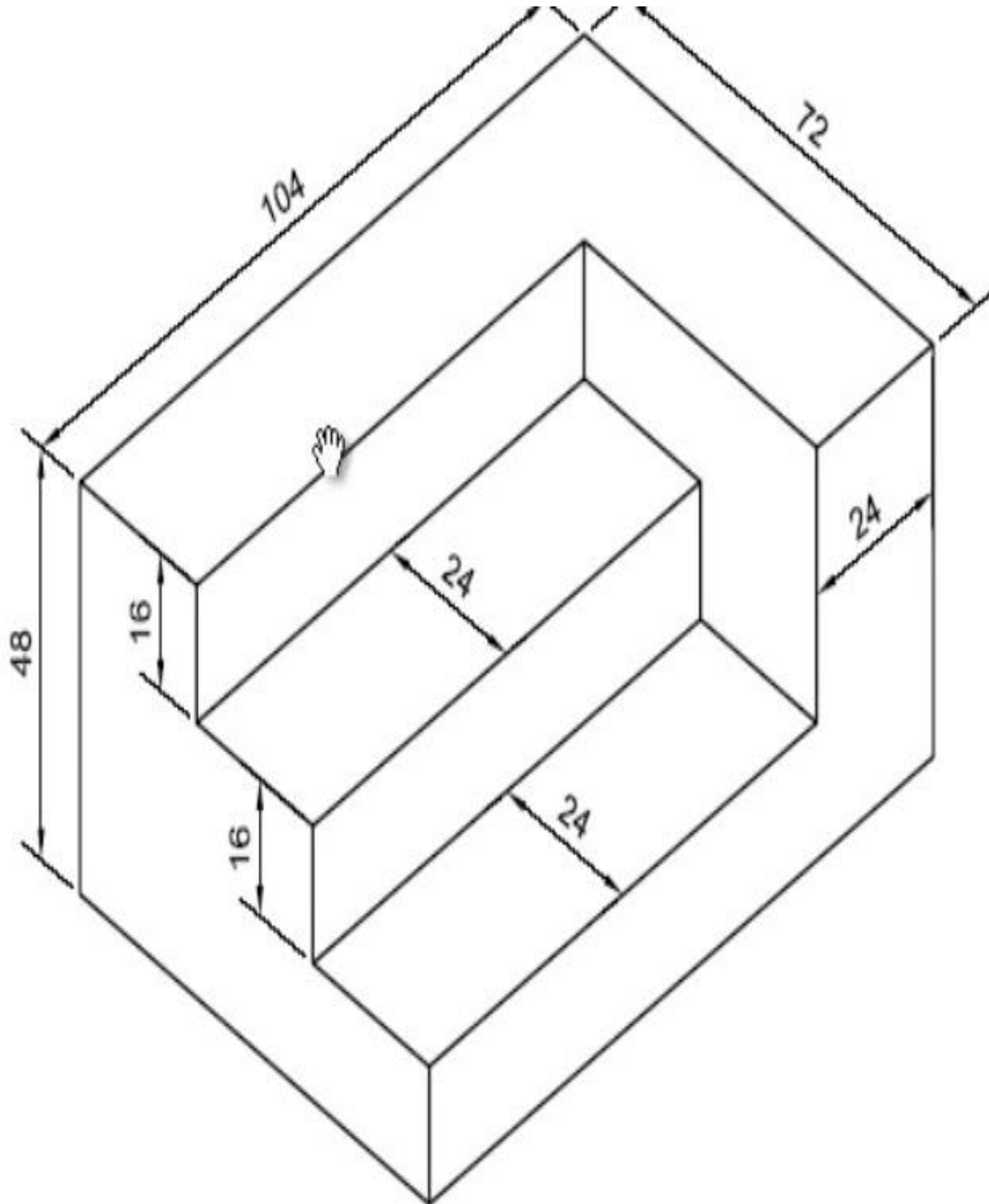
Assignment-3

Draw the following 3D diagram with the given dimensions.



Assignment-4

Draw the following 3D diagram with the given dimensions.



10. Sample Multiple Choice Questions (MCQs)

1. What does WCS stand for?
 - Western CAD System
 - Worldwide Coordinate Sectors
 - World Coordinate System
 - Wrong CAD Settings

2. When drawing in 2D, what axis do you NOT work with?
 - X
 - Y
 - Z
 - WCS

3. Polar coordinates are used mostly for drawing...?
 - Circles
 - Arcs
 - Vertical lines
 - Angled lines

4. How many snap points does an object have?
 - One
 - Two
 - Depends upon the object
 - At least four

5. How many points do you need to define for the rectangle command?
 - One
 - Two
 - Four
 - None