Lab 1
Name of Experiment: Introduction

1.1 Introduction

An engineering drawing is a controlled document used to convey information in a graphical way.

AutoCAD is a general purpose Computer Aided Design (CAD) program that can be used to prepare a variety of two Dimensional Drawings and three Dimensional Models.

Objective:

Objective of this lab is to –

- ➢ Learn a faster and accurate method for creating drawings than other traditional method.

Learning Outcomes:

Upon completion of this lab you will be able to-

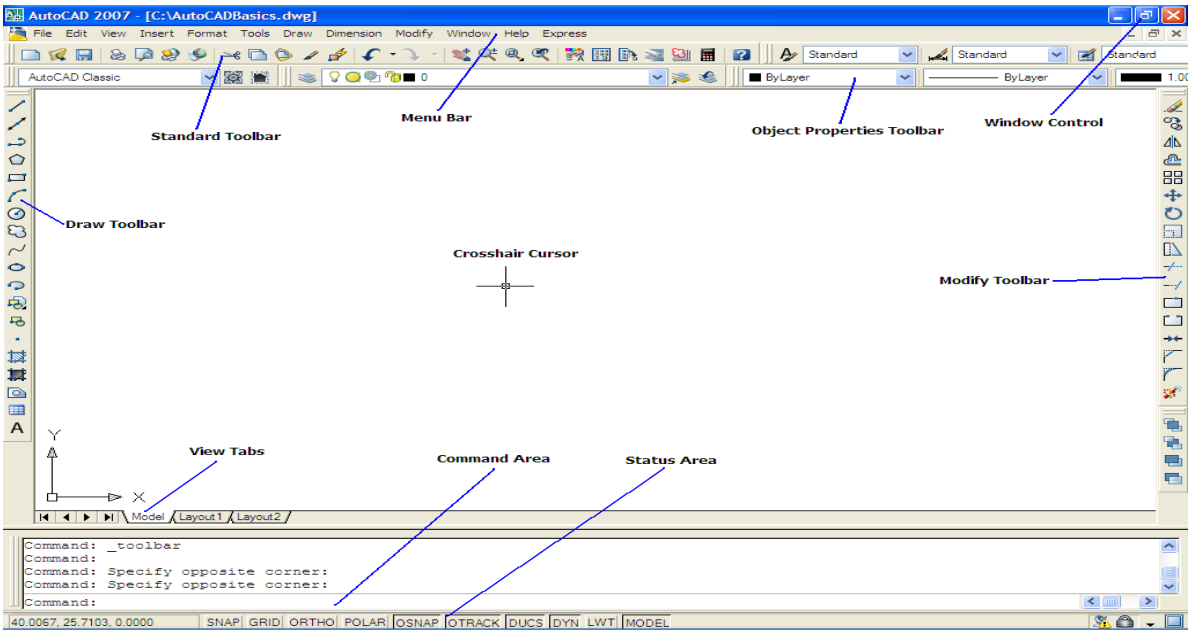
- ➢ Create, edit, and develop design alternatives using realistic solids and surfaces in an updated design environment.
- ➢ Communicate your ideas with powerful sketch, shadow, and rendering tools.

1.2 Launching AutoCAD

Start AutoCAD by Windows Start button❼Programs❼AutoDesk❼AutoCAD 2007❼AutoCAD 2007. Once AutoCAD is loaded, move the mouse around until you see a crosshair cursor. The AutoCAD window has a number of important features:

1. The standard Windows drop-down menus.
2. The standard Windows toolbar below the menus, it includes: File-New, File-Open, File-Save, Print and "Find and Replace"(!!).
3. In addition to the standard toolbar there will be a number of AutoCAD specific toolbars: Object Properties, Draw and Modify (there may be others...?).
4. The graphics area - that's the area where you draw - note the scroll bars and the axis label.
5. View Tabs - these 'tabs' give access to different view of the current drawing. The "model" tab should be selected at present.
6. The command area - this small window (by default) has space for three lines of text - this

is where you type commands.



7. The status area, at the bottom of the AutoCAD window, this includes the current cursor position.

Typically there are three ways of giving a command:

1. Type the command using the keyboard - the command is displayed in the command area.
2. Select the command from a menu.
3. Select the command's icon from a toolbar.

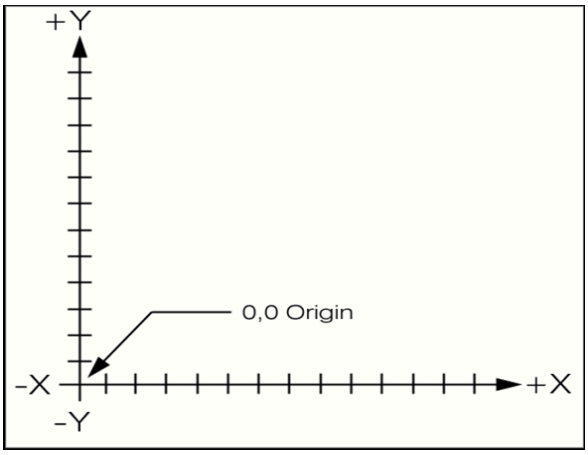
For example to draw a line, Type **LINE**↵. Then Move the crosshair near the bottom-left of the rectangle and click the left mouse button, then move the crosshair to the top-right of the rectangle and again click the left mouse button. Press ↵ to terminate the command, press ↵ again to re-start the command.

1.3 Cartesian coordinate system

AutoCAD provides the user with an infinite two dimensional area to work with. Any entities place on the working two dimensional planes can be defined relative to the Cartesian coordinate system.

The Cartesian coordinate system divides a two dimensional plane with two perpendicular axis. The X axis runs horizontal across the bottom of the screen. The Y axis runs vertically along the left side of the screen. These two axis intersect at the bottom left corner of the screen.

Each of these axis is further divided into segments. Each segment is given a value. The X axis segments increase in value to the right. The positive X values are to the right of the intersection of the two axis. The negative X values are to the left. The positive Y values are above the intersection and increase up. The negative Y values are below.



There are 3 coordinate systems used in any kind of drawing in AutoCAD. They are-

1) Absolute coordinates
2) Relative coordinates
3) Polar coordinates

✓ **Absolute Coordinate-**

✓ **Use #**

- All input points specify in your drawing using standard Cartesian co-ordinates x,y.
- Actually in this method, calculation of any point is related with root point.

Absolute coordinates

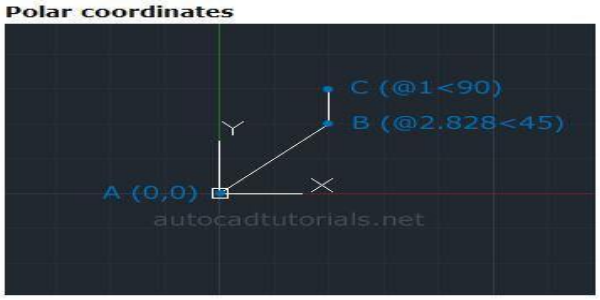
✓ **Relative coordinates**

- After first points entered, next points can be entered by specifying the next co-ordinates compare/ relative from the first points.
- The relative coordinate started with symbol "@" tell AutoCAD it was a relative coordinates.

Relative coordinates

✓ **Polar coordinates**

- Polar coordinates used when you need to draw the next points at specify angle. Polar coordinates system in AutoCAD specifies distance length at which angle.
- Using polar coordinate, points entered by typing @distance<angle



1.4 Lab Organization:

In the lab, at first we will discuss about the basic commands that you will need to perform this lab. Then you will be shown a demonstration on the commands discussed today using AutoCAD 2007. After that you will be given some assignments to practice these commands.

Name of Experiment: Draw Commands

2.1 Introduction

AutoCAD is a general purpose Computer Aided Design (CAD) program that can be used to prepare a variety of two Dimensional Drawings and three Dimensional Models.

Learning Outcomes:

Upon completion of this lab you are expected to be able to-

- ➢ Draw basic 2D objects like-line, rectangle and circle using AutoCAD.

2.2 Line Command

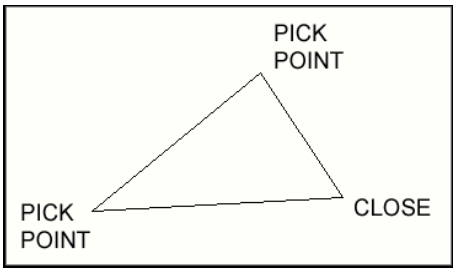
1. **Type** LINE from the command prompt (Command: **LINE** or **L)**
2. **Press** ENTER
3. **Pick** From point: (**point**)
4. **Pick** Specify next point or [Close/Undo]:(**point**)
5. **Pick** Specify next point or [Close/Undo]:(**point**)
6. **Press** ENTER to end line sequence

or

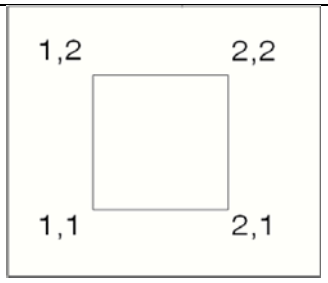
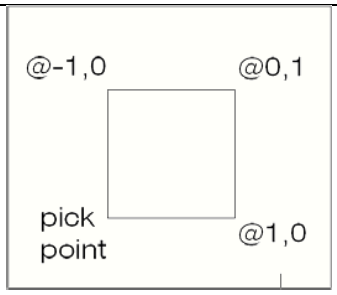
Type U to undo the last segment

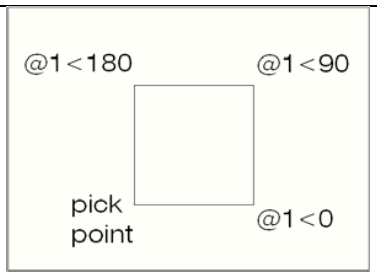
or

Type C to close the polygon



2.3 Drawing Rectangles using Line Command

Using Absolute Coordinate **Type** x,y coordinate when AutoCAD asks for a point. From point: **1,1 , use #** To point: **2, 1** To point: **2,2** To point: **1,2** To point: **1,1**	
Using Relative Coordinate **Type** @deltax,deltay when AutoCAD asks for a point. From point pick point To point: **@1,0** To point: **@0,1** To point: **@-1,0** To point: **@0,-1**	

Using Polar Coordinate **Type** @distance<angle when AutoCAD asks for a point. From point: pick point To point:**@1<0** To point:**@1<90** To point:**@1<180** To point:**@1<270**	

2.4 Rectangle Command

1. **Type** Rectangle from the command prompt (Command: **Rectangle** or **REC)**
2. **Press** ENTER
3. **Pick** first corner point: (**point**)
4. **Pick** Specify next corner point or [Close/Undo]:(**point**)
5. **Press** ENTER to end line sequence

or

Type U to undo the last segment

or

Type C to close the polygon

2.5 Circle Command

1. **Type** CIRCLE at the command prompt. (Command: **CIRCLE or C)**
2. **Type** One of the following options:

   3P/2P/TTR/<<center point>>:

   or

   Pick A center point.

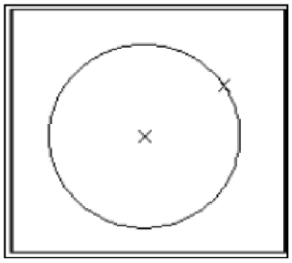
3. **Type** A radius or diameter.

   or

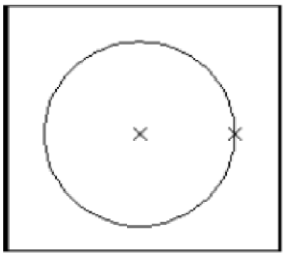
4. **Pick** A radius or diameter

   Diameter/<<radius>

Circle, Center Radius



Circle, Center Diameter

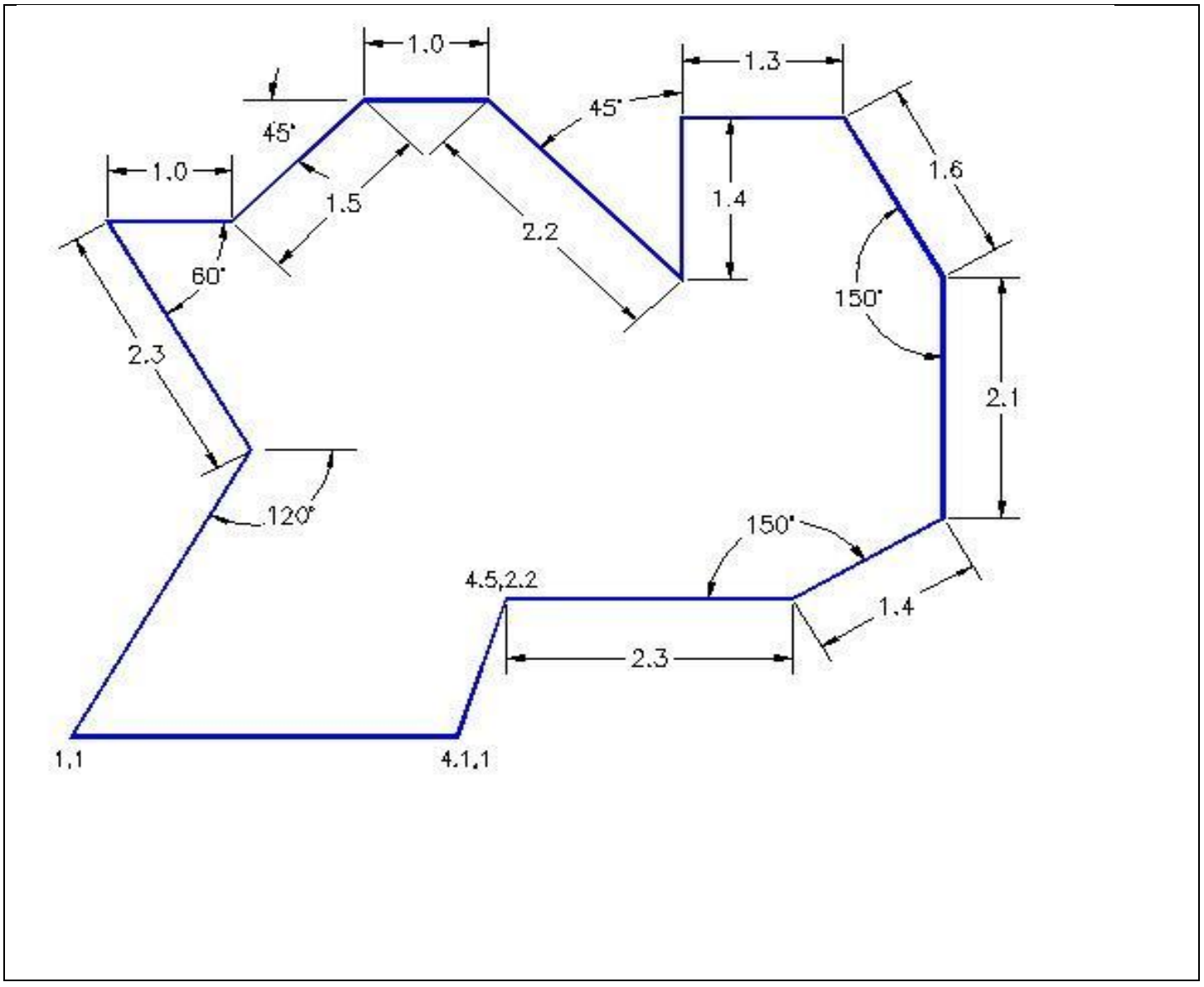


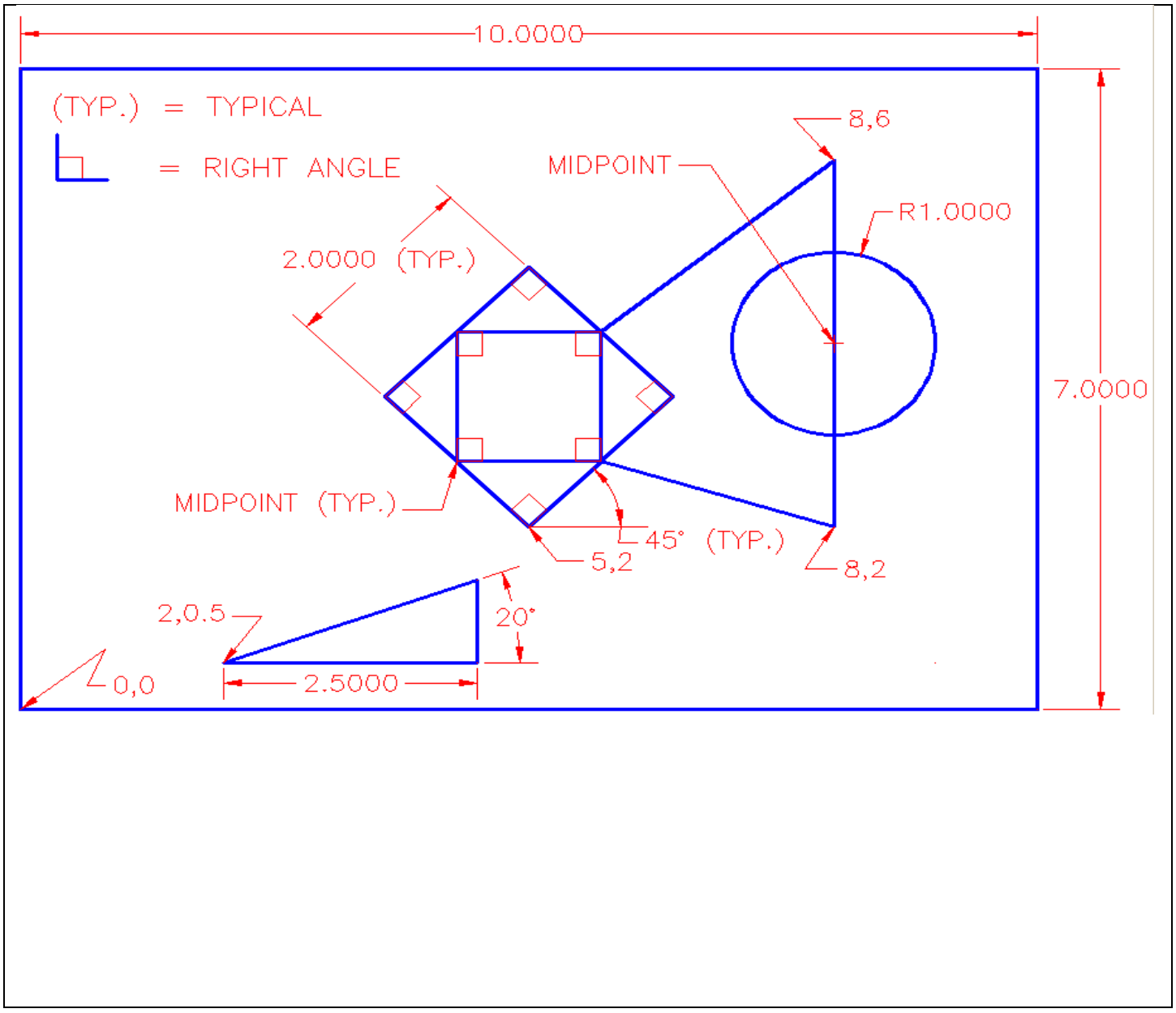
2.6 Summary:

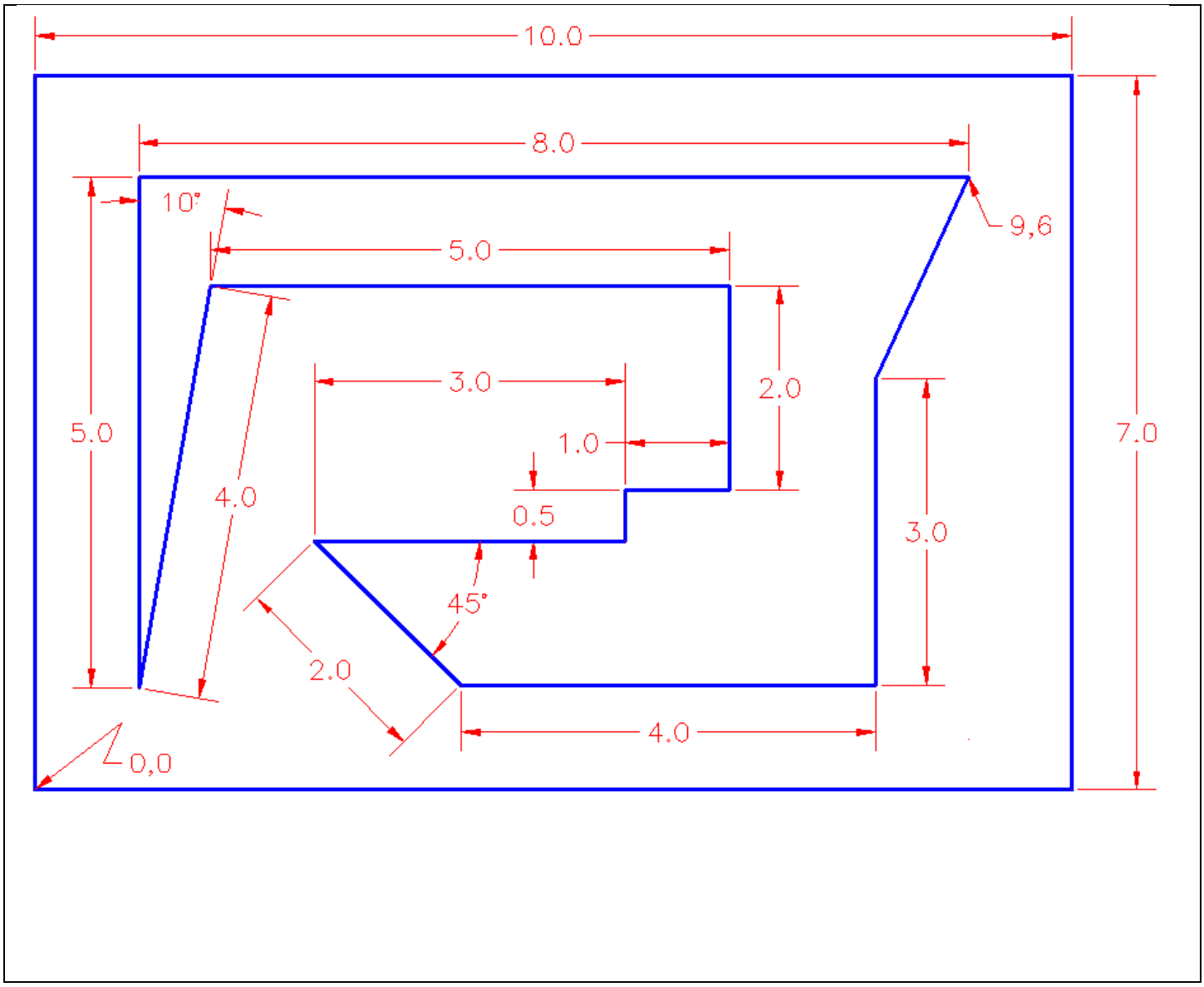
Command	Keystroke
Line	Line / L
Circle	Circle / C
Erase	Erase / E
Rectangle	RECTANGLE / REC

2.7 Assignments:

Draw the given three pictures below using AutoCAD.


1.0
45°
1.0
1.5
2.2
45°
1.3
1.4
1.6
60°
150°
2.3
2.1
120°
150°
4.5,2.2
1.4
2.3
1,1
4.1,1


10.0000
7.0000
(TYP.) = TYPICAL
= RIGHT ANGLE
8,6
MIDPOINT
R1.0000
2.0000 (TYP.)
MIDPOINT (TYP.)
45° (TYP.)
5,2
8,2
2,0.5
20°
0,0
2.5000


10.0
8.0
10°
5.0
9,6
5.0
4.0
3.0
2.0
1.0
0.5
7.0
3.0
45°
2.0
4.0
0,0