Drawing Simple Geometric Shapes using Snap and Grid

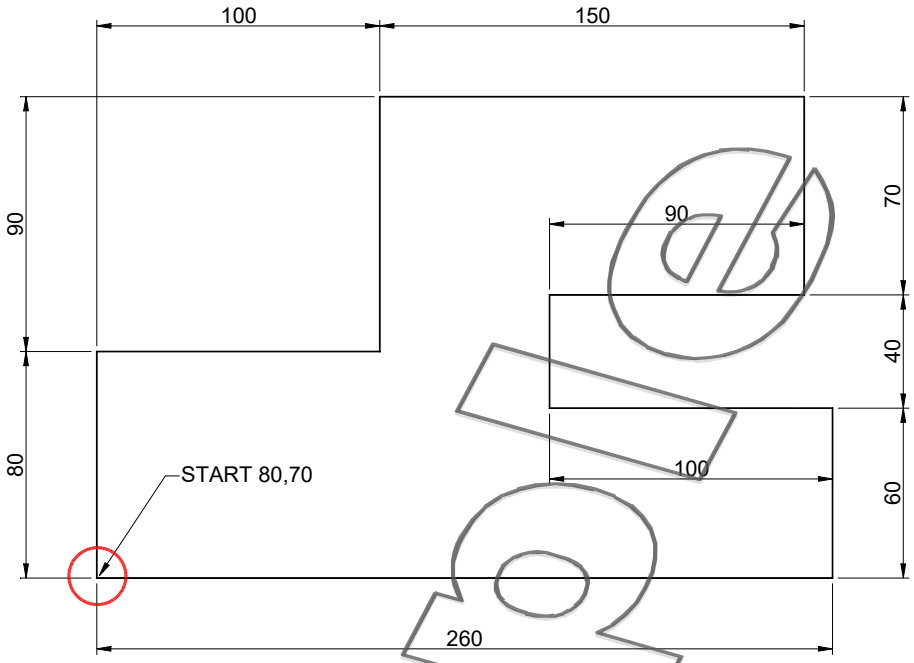


Figure 11 Geometric Shape

16 Using the **Line** command, draw the shape shown in Figure 11 with the aid of **SNAP** and **GRID**. The dimensions are for information only. DO NOT attempt to dimension the drawing, but it must be drawn accurately to the dimensions shown.

17 **Erase** the above drawing when you have finished, and for **Self Assessment**, draw the "**Book Case**" as shown in Figure 12. Use the dimensions given.

DO NOT include the dimensions or text, they are there for your reference only. Any dimension not given is left to your discretion. The whole drawing can be completed with the aid of **SNAP** and **GRID**.

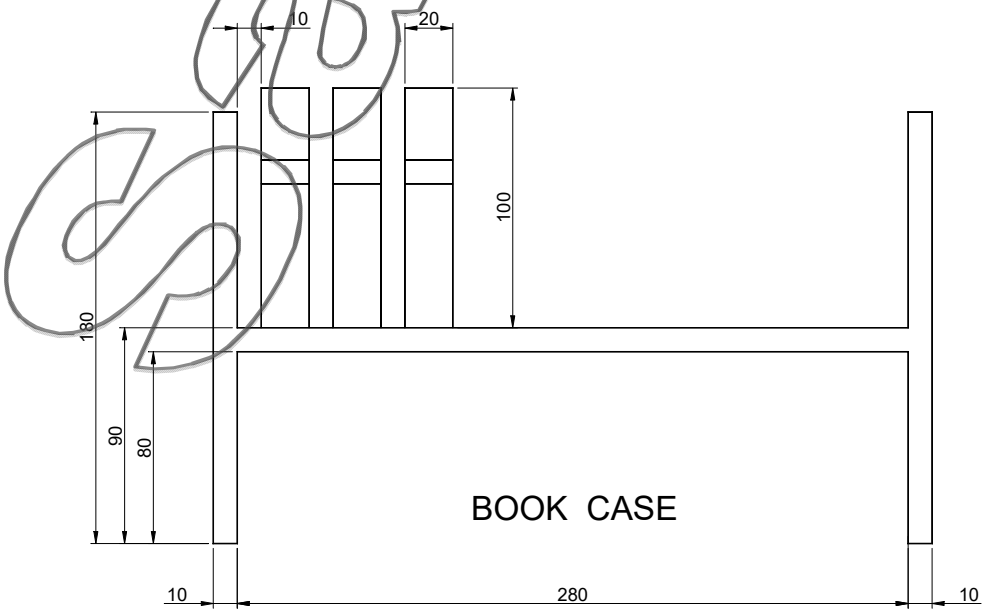


Figure 12 Book Case

Coordinate Drawing

This next section will show you how to draw accurately, any shape to any size using three methods of coordinate entry: **Absolute X,Y Coordinates**, **Relative X,Y Coordinates**, and **Relative Polar L<A Coordinates**.

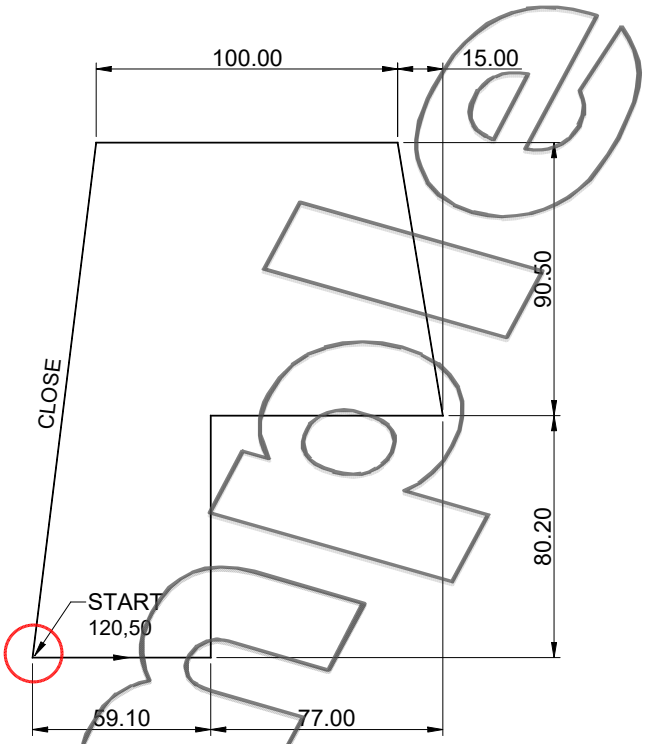
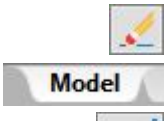


Figure 13

Figure 13 shows the drawing you are about to draw using in the first instance, **Absolute Coordinates**, then the drawing is completed using **Relative Coordinates**.

Absolute Coordinates (X,Y)



18 **Erase** the existing drawing and turn **Off** all buttons/commands at the left-hand end of the **Status** bar. **MODEL** (Drawing Layout) tab should be active on the **Layout Tab** bar.

19 Click the **Line** button from the **Draw** panel on the **Home** tab of the **Ribbon**, and type in at the **Command:** line, the **Absolute Coordinate** values for **X** and **Y** of ***120*** and ***50***.

Command: **_Line**
Specify first point: *Enter* ***120,50*** Note that each value must be separated by a comma.

This positions the **Start Point** for drawing the horizontal line at **120 mm** in the **X direction** and **50 mm** in the **Y direction** measured from the **Origin (Absolute) Point** of the drawing (**0,0,0**) - see Figure 14, which is usually in the bottom left-hand corner of the graphic window.

Specify next point or [Undo]: *Enter* ***179.1,50***

Entering **179.1,50** for the **X,Y** values establishes the other end of the horizontal line,which is again measured from the **Origin Point** (**0,0,0**) of the drawing.

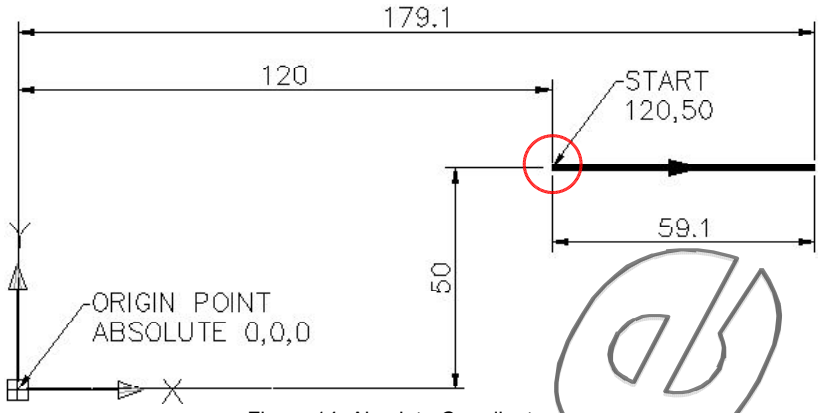


Figure 14 Absolute Coordinates

Note: When using **Absolute Coordinate** entry, all **X,Y** values are measured from the **Origin Point** of the drawing. If the start point is known in terms of **X,Y** from the **Origin Point**, simple shapes can be drawn using this Absolute Coordinate mode of entry, but remember, all points must be measured from **0,0,0** (absolute).

This mode of entry is somewhat tedious and calculations have to be made (and mistakes). You'll now complete the rest of the drawing using the **Relative Coordinate** mode of entry.

Relative Coordinates

Shift + The format for **Relative Coordinate** mode is **@X,Y**. The **X** value is the horizontal distance and **Y** is the vertical distance. The "**@**" character is obtained by holding the ***[SHIFT]*** key down on the keyboard and pressing the ***Apostrophe*** key, ie ***[SHIFT]+[']***, which **MUST** precede the **X,Y** coordinates on each occasion of entry.

20 You should still be connected to the end of the **59.1** long line. Complete the drawing by typing in at the **Command:** line the following **Relative Coordinate** values.

21 Specify next point or [Undo]: *Enter* ***@0,80.2*** (trailing zero not required)
@77,0
@-15,90.5 (this is *minus 15,90.5*)
@-100,0 (this is *minus 100,0*)
C (for Close)

Note: If a mistake is made, it can be corrected by long right-clicking and from the pop-up menu that appears, clicking on **Undo**, which will undo only the last command.

Figure 15

How it works

The "**@**" character tells Autodesk AutoCAD to draw from the **last point**. Specifying **@0,80.2** draws a line of zero (**0**) in the **X** direction and **80.2** long in the **Y** direction (vertical) from the last point - see Figure 16 overpage.

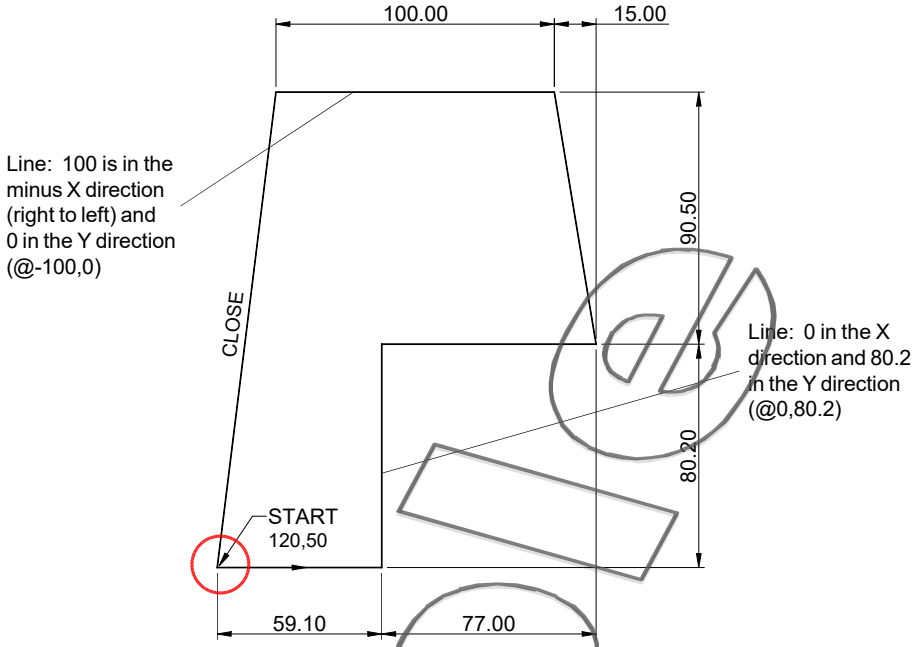


Figure 16 Relative Coordinates

SELF ASSESSMENT - Relative Coordinates (@X,Y)

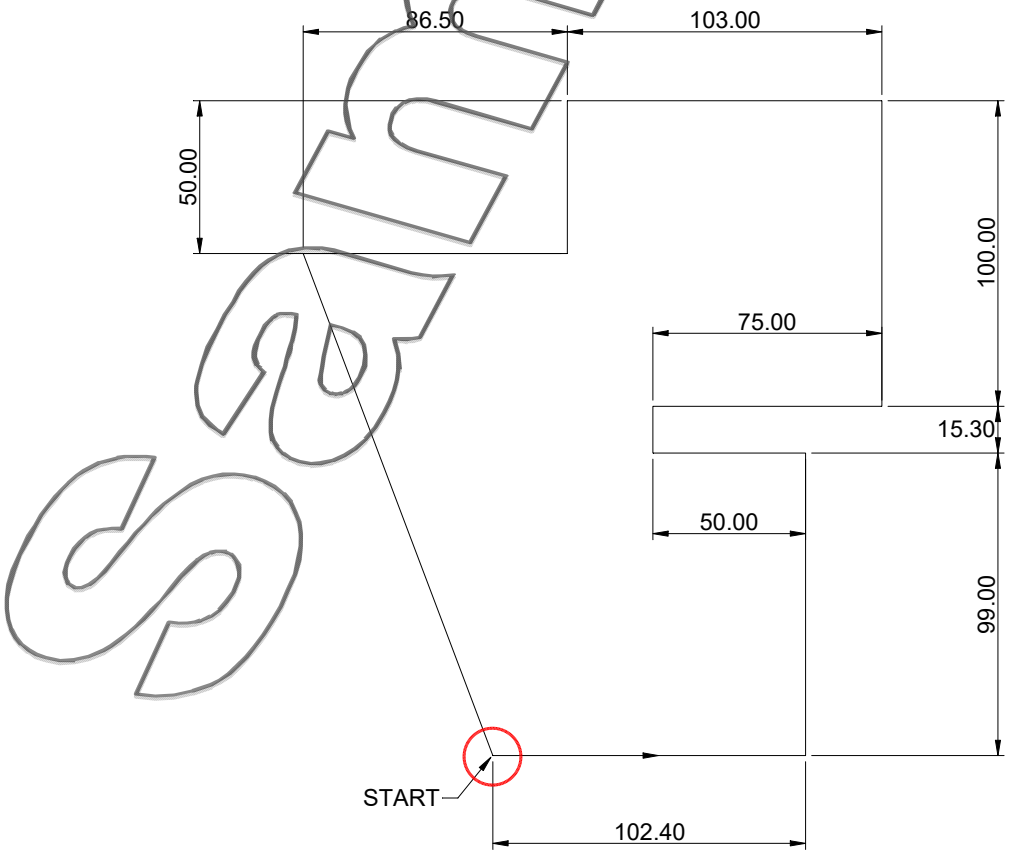


Figure 17 Relative Coordinates

22 Complete the **Self Assessment** in Figure 17 using the **Relative Coordinate** mode.

Erase the last drawing and start drawing the new shape by **picking** a point near the bottom left of the screen. You have all the information you need to draw the shape, and if you are not sure, then refer back to previous pages. The full Command dialogue has been given at the end of this Section if you get really stuck (Figure 53).

Relative Polar Coordinates (@L<A)

This is somewhat different to the last method. Instead of specifying an X,Y coordinate value you specify a **Length of line** and **Angle**. In some ways this is an easier method of entry once you have remembered the angles.

By default, Autodesk AutoCAD uses the angular directions shown in Figure 18, with positive values in an anti-clockwise (ACW) direction.

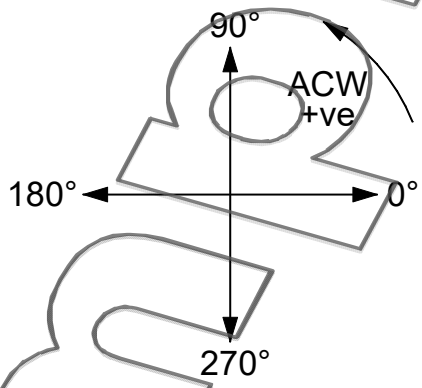


Figure 18 Angular Directions

The technique used to draw the object is in the form of: @ length of line and its angular direction, (**@L<A**). The direction is usually one of the angles shown above, but of course it could be any angle you choose.

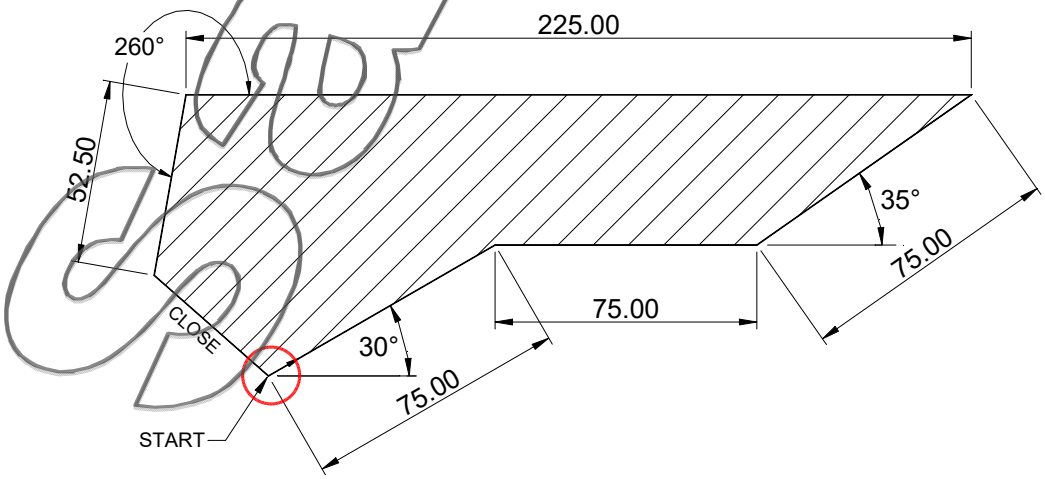


Figure 19 Relative Polar Coordinates

23 **Erase** the last drawing - try using **Erase Window**.

24 Click the **Line** button and start by **picking** a point near the bottom left corner of the graphics window.

25 At the **Command:** line enter ***@75<30***

This will draw the first line **75mm** long at **30°** to the horizontal.

Note: The "**<**" character is obtained by holding the ***[SHIFT]*** key down on the keyboard and pressing the ***Comma*** key, *ie* ***[SHIFT]+[,]***.

26 Now type ***@75<0***

This will draw the next line horizontally to the right, because **0°** is in the **East** direction (see Figure 18). Continue and finish drawing the shape for your self assessment. Think of **Relative Coordinate** mode as:

@ LINE-LENGTH < ANGLE-DIRECTION

The full **Command** dialogue is given in Figure 54, but try to do it on your own first.

SELF ASSESSMENT - Complex Shape

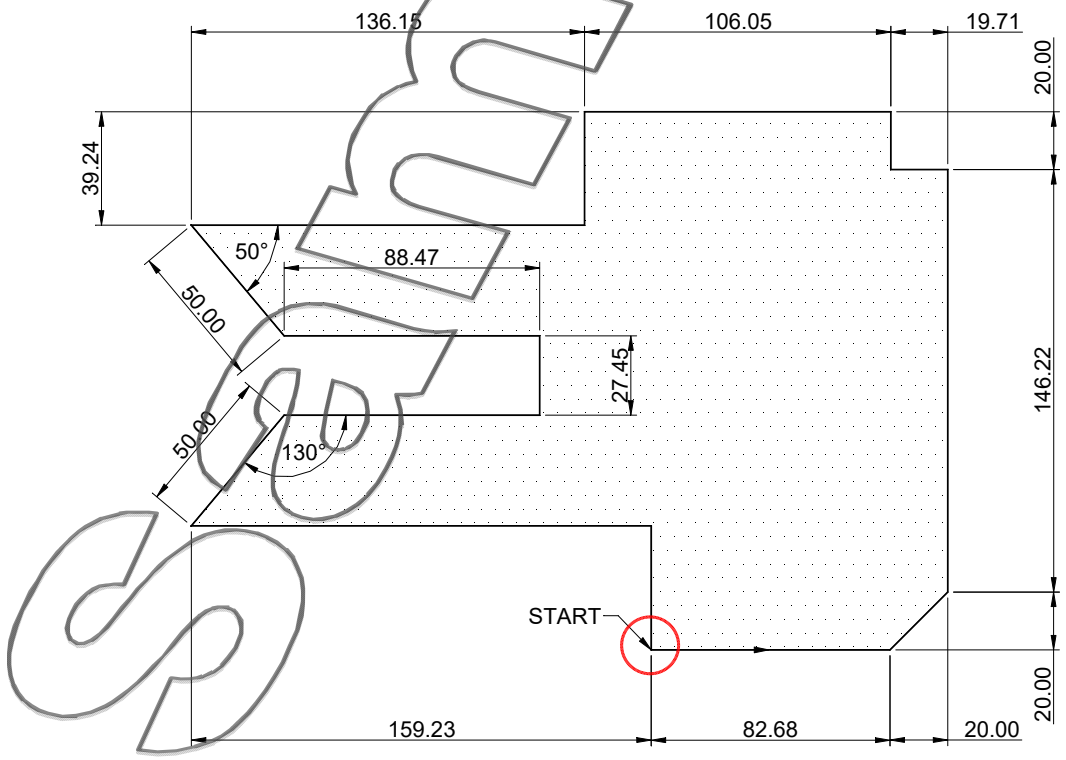


Figure 20 Complex Shape

27 **Erase** the last drawing and draw the above Complex Shape using <u>any</u> method of Coordinate entry you choose. A full Command dialogue is given in Figure 55.