



ثانوية التكنولوجيا التطبيقية  
Applied Technology High School

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# AutoCAD 3D I

## Module 6

### Visualizing Multiview Drawings

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PREPARED BY

**Curriculum Development Unit**

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## Module 6

# Visualizing Multiview Drawings

### Module Objectives

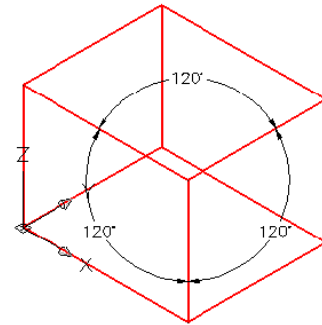
Investigate multi-view drawings and extract the 3D model from them

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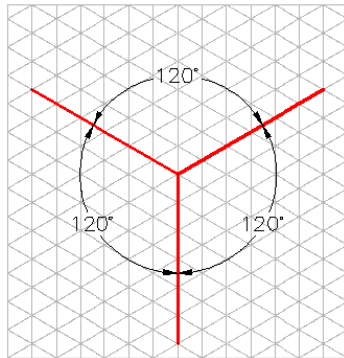
## 1. Visualizing 3D Models

In the first six modules, you were asked to construct wireframe models and were given a 3D view of the model to work from. Since most technical drawings used in the drafting and design world are 2D multiview drawings, you must be able to draw 3D models using a multiview drawing to find the object's shape and dimensions. To construct a 3D model from a multiview drawing, you must be able to mentally visualize the 3D model by looking at the multiview drawing. If you need to refresh your knowledge of multiview drawings, read Module 17 in the AutoCAD 2D Modules.

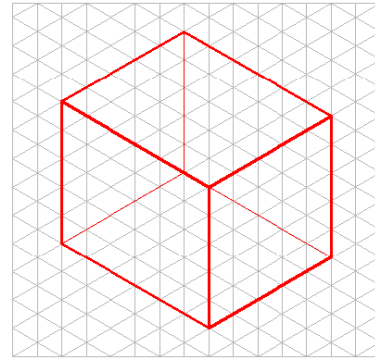


**Figure 6-1**  
An Isometric Drawing

A good way of learning to visualize a 3D model from a 2D multiview drawing is to draw the model as an isometric. By doing this, you will learn to form a mental image from the multiview drawing. After you get more practice doing this, you will be able to visualize and construct 3D models without drawing the isometric.



**Figure 6-2**  
An Isometric Grid



**Figure 6-3**  
A Rectangular Box Drawn on  
an Isometric Grid

An **isometric drawing** is a 2-dimensional drawing that has the XYZ axis drawn at 120 degrees apart as shown in Figure 6-1. To help you draw the isometric, you will be drawing on an isometric grid. An isometric grid, has the grid lines drawn at 120 degrees as shown in Figure 6- 2. Figure 6-3 shows a rectangular box drawn on the isometric grid.

## 2. Practical Exercise

### Visualizing 3D Models

**Step 1** Using the NEW command, start a new drawing using the template Module Template 3D English.

**Step 2** Save and name the drawing AutoCAD 3D Workalong 06-1.

**Step 3** Set the UCS to World and the view to Top. Using the INSERT command, insert the block AutoCAD 3D Workalong 07-1 at the coordinates 0,0,0. Explode the block. Your drawing should appear as shown in Figure Step 3.

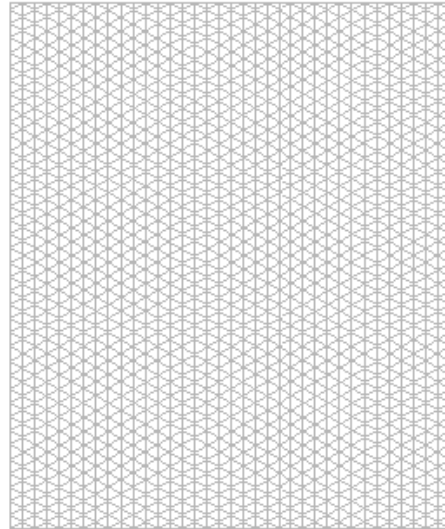


Figure Step 3

**Important Note**

In this workalong, you will be using AutoCAD to draw isometric drawings of objects on a two dimensional isometric grid. This is only a teaching tool to help you visualize 3D models using the multiview drawing of the object. Isometric drawings were used extensively in the drafting field before CAD was used. With AutoCAD, you can draw in true 3D and isometric drawing is not really required. They are however, a good teaching tool.

**Step 4** Create the layers Grid and Object as shown in Figure Step 4.

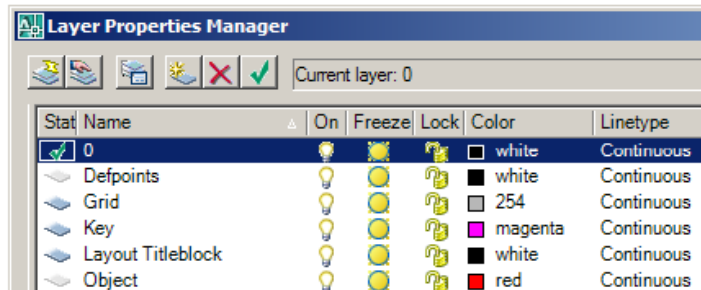


Figure Step 4

**Step 5** Change the layer of the isometric grid from layer 0 to layer Grid. After you do that, it should appear a grey color. Lock layer Grid and set the lineweight of layer Object to 0.35 mm as shown in Figure Step 5.

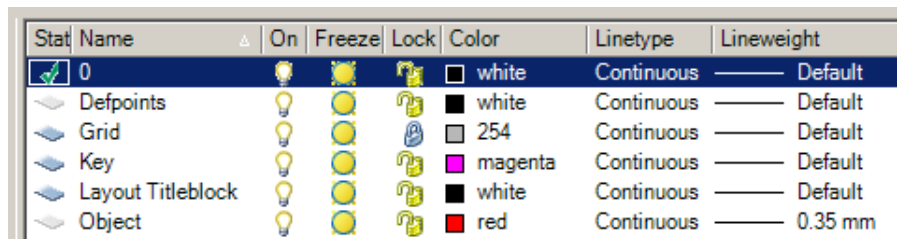
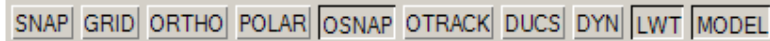


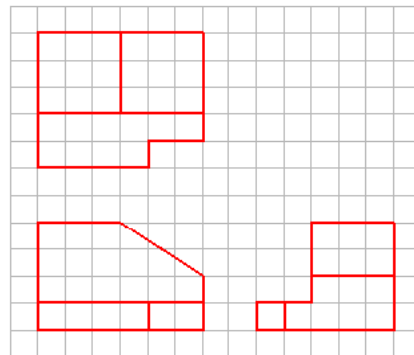
Figure Step 5

**Step 6** Enable OSNAP and LWT as shown in Figure Step 6.



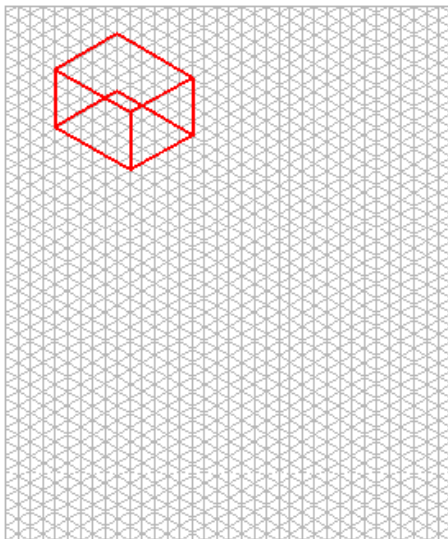
**Figure Step 6**

**Step 7** Figure Step 7A shows the multiview drawing of Object 7-1. layer Object as the current layer and draw a box 6 grids long, 5 grids wide and 4 grids high. Where you draw it is not that important but locates it somewhere in the top left corner. Ensure you snap to grid intersections at all times. Since layer Grid is locked, you can freely move the lines on layer Object, as required. See Figure Step 7B and 7C.

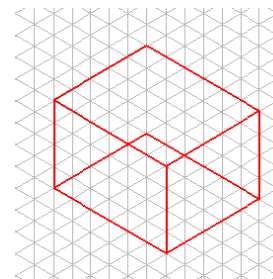


Set

**Figure Step 7A**  
Multiview Drawing - Object 7-1



**Figure Step 7C**



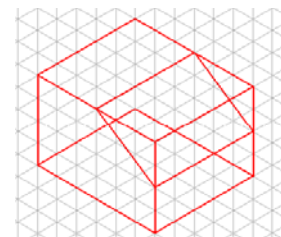
**Figure Step 7B**

**Important Notes**

One grid on the multiview drawing equals one grid on the isometric. If you need to refresh your memory of multiview drawings, read Module 17 in the AutoCAD 2D Modules.

Solve one view at time. Pick the view with the hardest contour to start with. In this case, start with the front view.

**Step 8** To draw the contour of the front view, you will have to count number of grids for the diagonal cut off. It is 3 grids on the X axis and 2 grids on the Z axis. Using those dimensions, draw the inclined

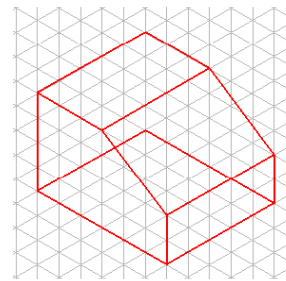


lines on the front and rear view and add the lines to connect them as shown in Figure Step 8.

**Step 9** Trim and delete the lines to complete the contour of the front view as shown in figure Step 9.

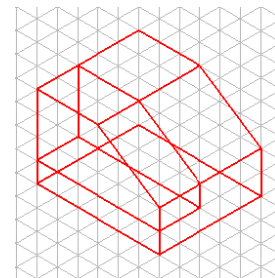
**Figure Step 9**

**Figure Step 8**



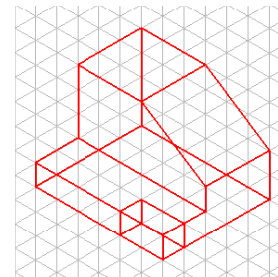
**Step 10** Add the lines to cut out the contour of the right side view as shown in Figure Step 10

**Figure Step 10**

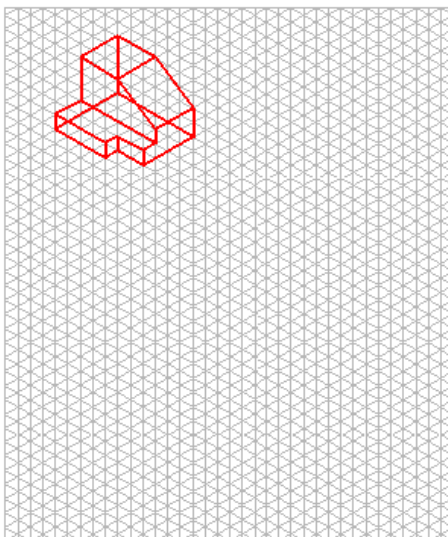


**Step 11** Trim and delete the necessary lines to complete the right side view contour and then add the lines to form the top view contour. See Figure Step 11.

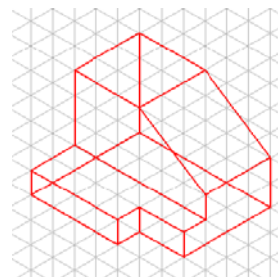
**Figure Step 11**



**Step 12** Trim and delete any unwanted lines and the isometric is complete for Object 7-1 as shown in Figure Step 12A. Your drawing should appear similar to Figure Step 12B.

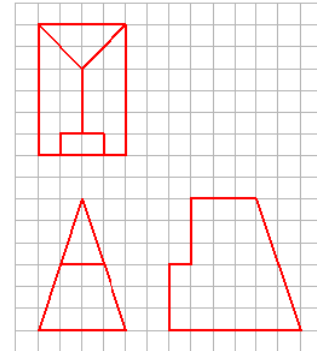


**Figure Step 12B**



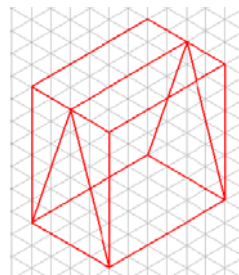
**Figure Step 12A**

**Step 13** Using what you just learned, draw the isometric drawing of Object 7-2 shown in Figure Step 13. Draw it in the top right corner of the grid.

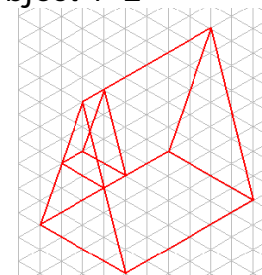


**Figure Step 13**  
Multiview Drawing  
Object 7-2

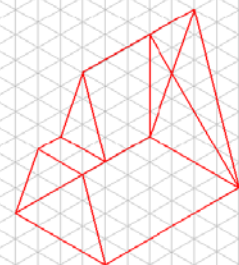
**Step 14** Figure Step 14A, 14B, 14C and 14D shows you the necessary steps. Try to complete the isometric drawing without looking at the figures. If you have trouble completing it, study the figures on the next page.



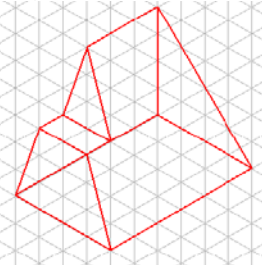
**Figure Step 14A**



**Figure Step 14B**

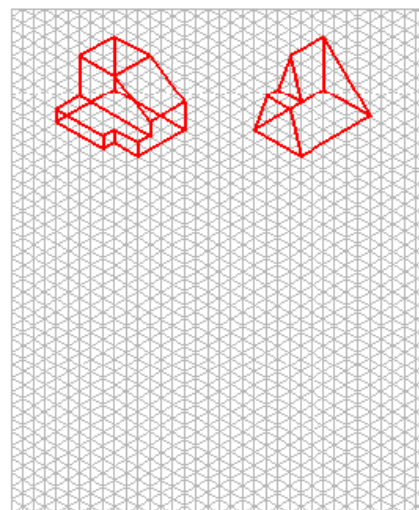


**Figure Step 14C**



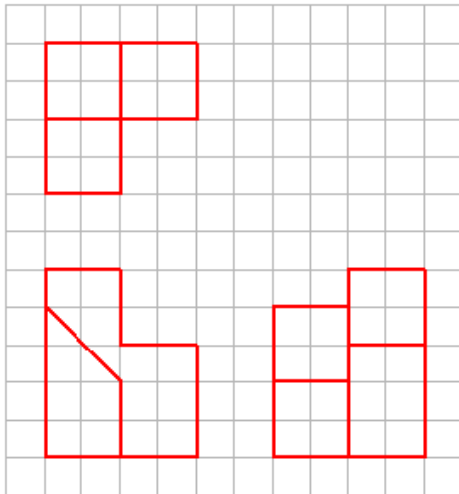
**Figure Step 14D**

**Step 15** Your drawing should now appear similar to Figure Step 15.

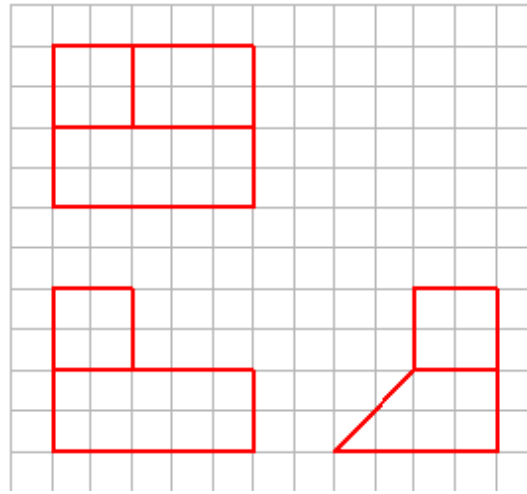


**Figure Step 15**

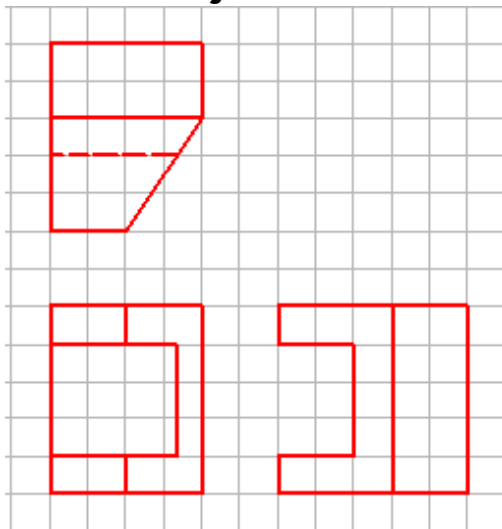
**Step 16** Using what you just learned, draw isometric drawings of four objects Object 7-3 to Object 7-6 shown below. For answers, see page 11. Try to visualize the 3D model by looking at the multiview drawing and then draw the isometric. Don't look at the answers until you have done your best to complete the isometric drawing of each object.



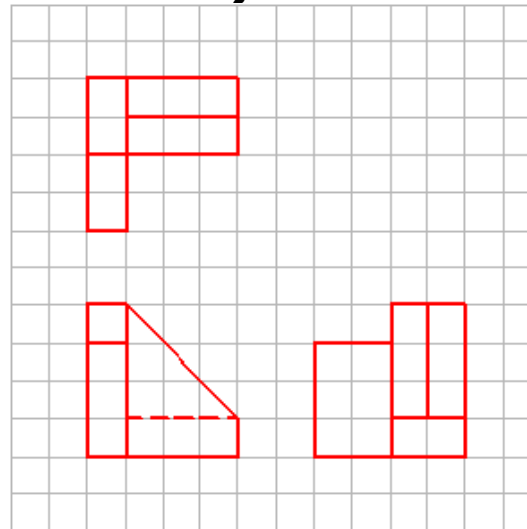
**Object 7-3**



**Object 7-4**



**Object 7-5**



**Object 7-6**

**Step 17** Save and close the drawing.



### 3. Summary Module 6

1. An isometric drawing is a 2-dimensional drawing that has the XYZ axis drawn 120 degrees apart.
2. An isometric drawing is only used in the AutoCAD Modules as a teaching tool. They are obsolete in the CAD drafting world.

### 4. Suggestions for practice

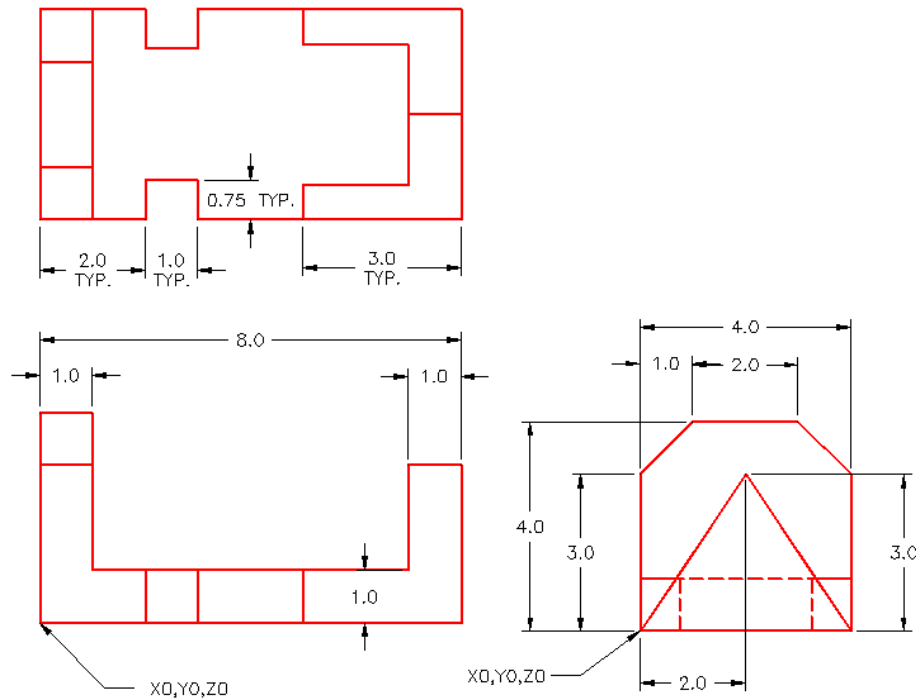
1. An isometric drawing is a 2-dimensional drawing that has the XYZ axis drawn 120 degrees apart.
  - A. True
  - B. False
2. How many degrees apart is the XYZ axis in a 2 dimensional isometric drawing?
  - A. 60
  - B. 90
  - C. 120
  - D. 180
  - E. 360

5. Lab. Exercise

AutoCAD 3D Lab Ex.6-1			
Drawing Specifications			
Name	Template	Units	
AutoCAD 3D Lab. Ex. 6-1	Module Template 3D English	Inches	
Layering Scheme			
Objects on Layer	Name	Color	Line type
Construction Objects	Construction	253	Continuous
Model space objects	Model	Red	Continuous

**Instructions:**

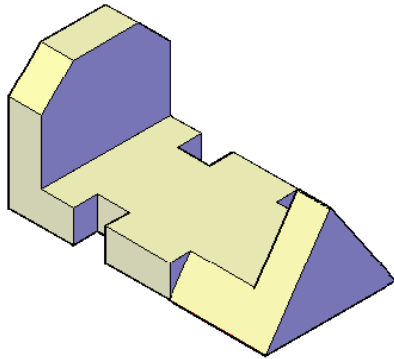
1. Draw a wireframe model using the multiview drawing shown below.
  2. Draw all construction objects on layer Construction and model objects on layer Model.
  3. When complete, freeze layer Construction.
  4. Change the current UCS to World and check the model with the key.
- Hint: Study the multiview drawing and select the best view to start the wireframe. It is the one with the most difficult contour. Answer on page 11.



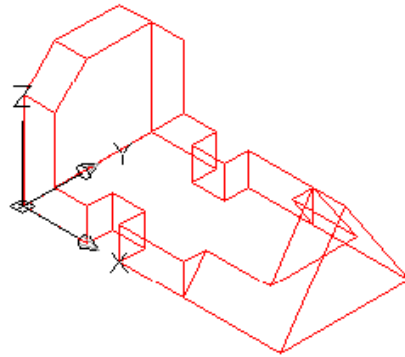
Multiview Drawing

**Hint 1**

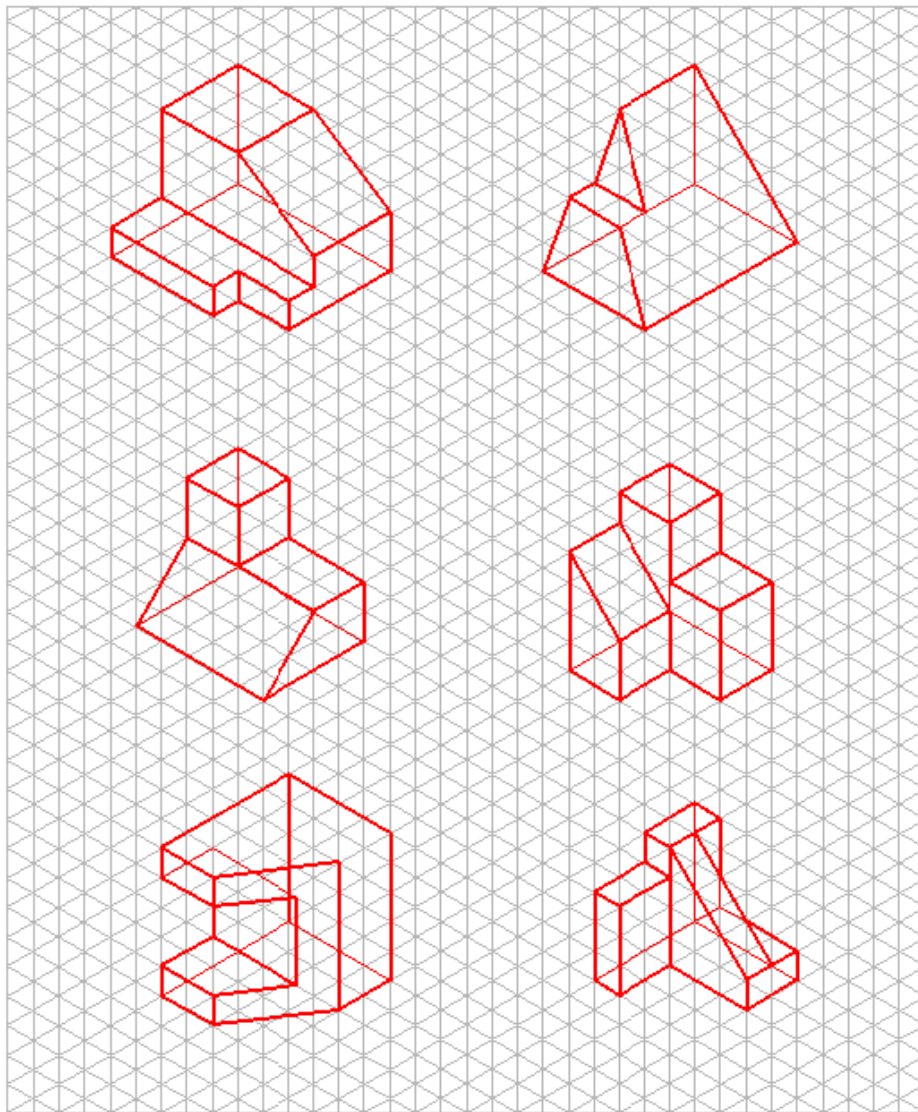
The front view is the best view to start the wireframe.



Solid Model - SE Isometric View



Complete Wireframe Model



Isometric drawing of Object 6-1 to Object 6-6