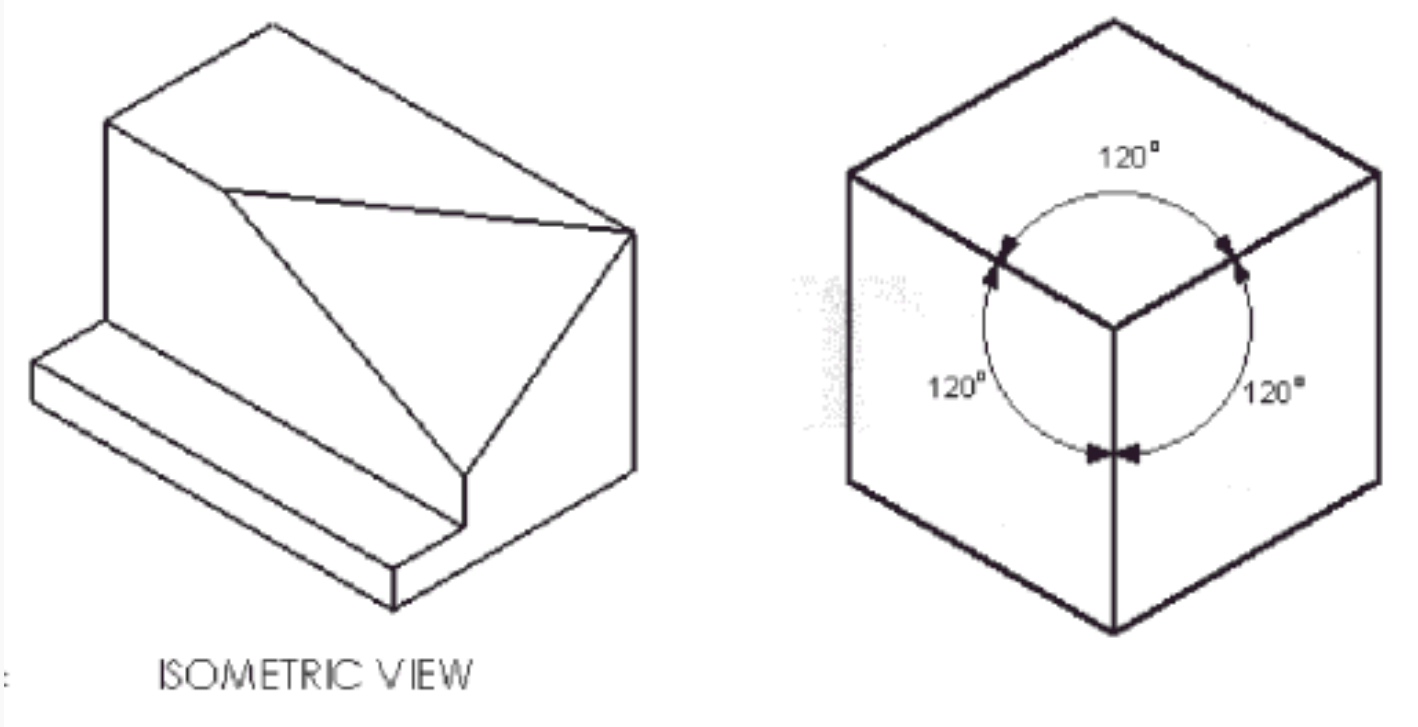
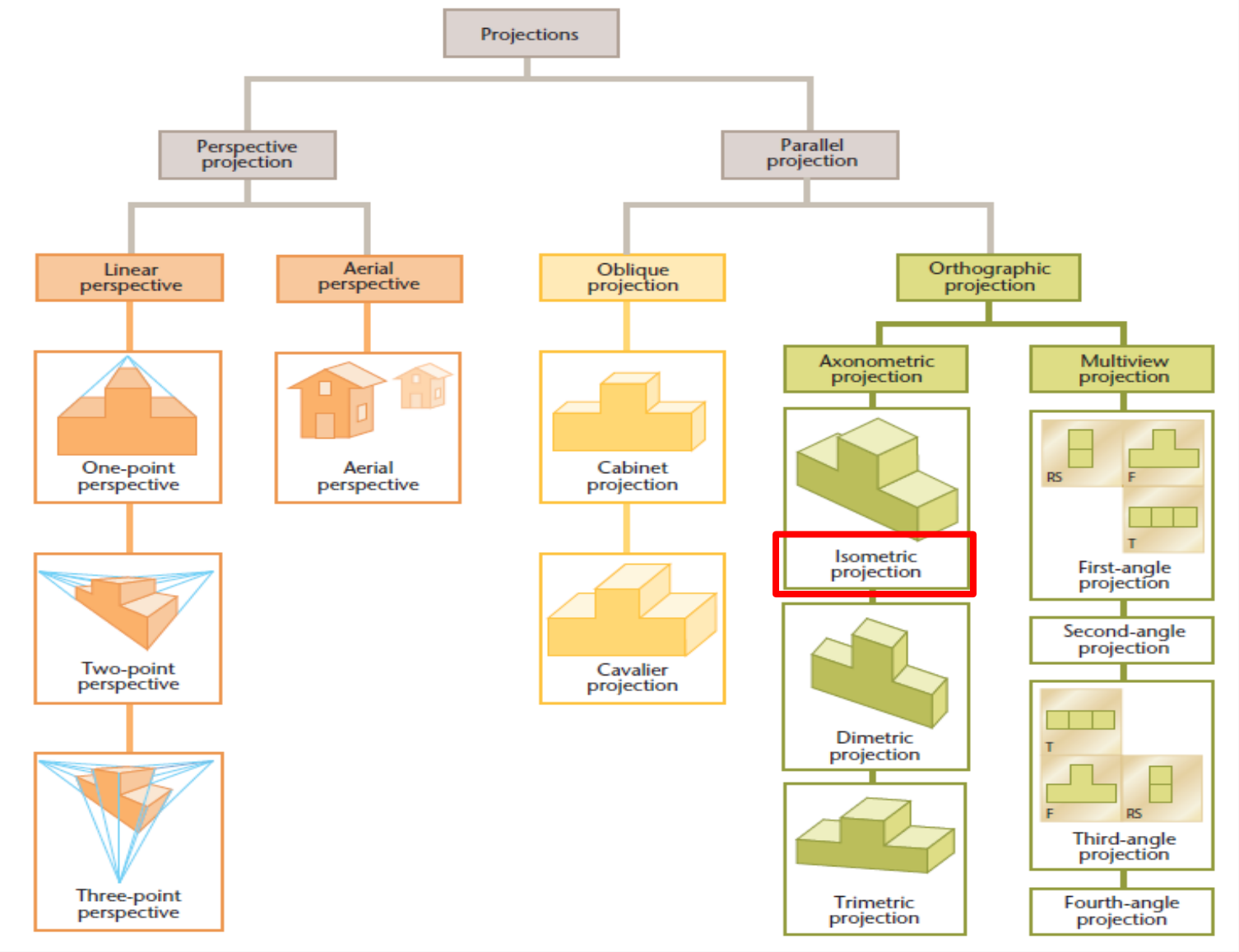
# BNG 101 – Engineering Graphics

## **Slide Set 3** – Orthographic Projection II – Isometric Projection




(Read Planchard 2-1 to 2-10)

# Projections

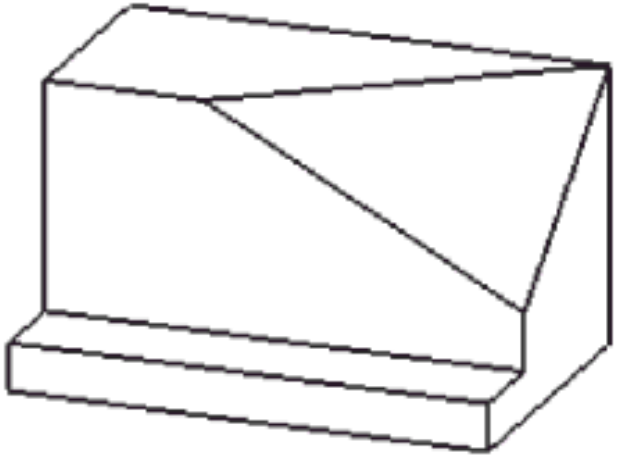


# Types of axonometric projections

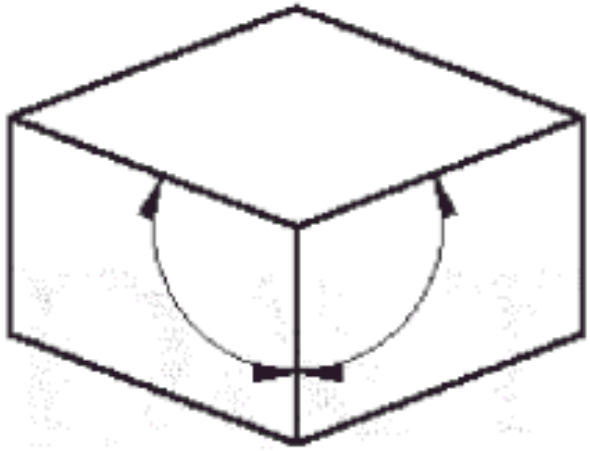
**Dimetric**

Two of the three axes have equal angles (usually around 105°)


*Dimetric



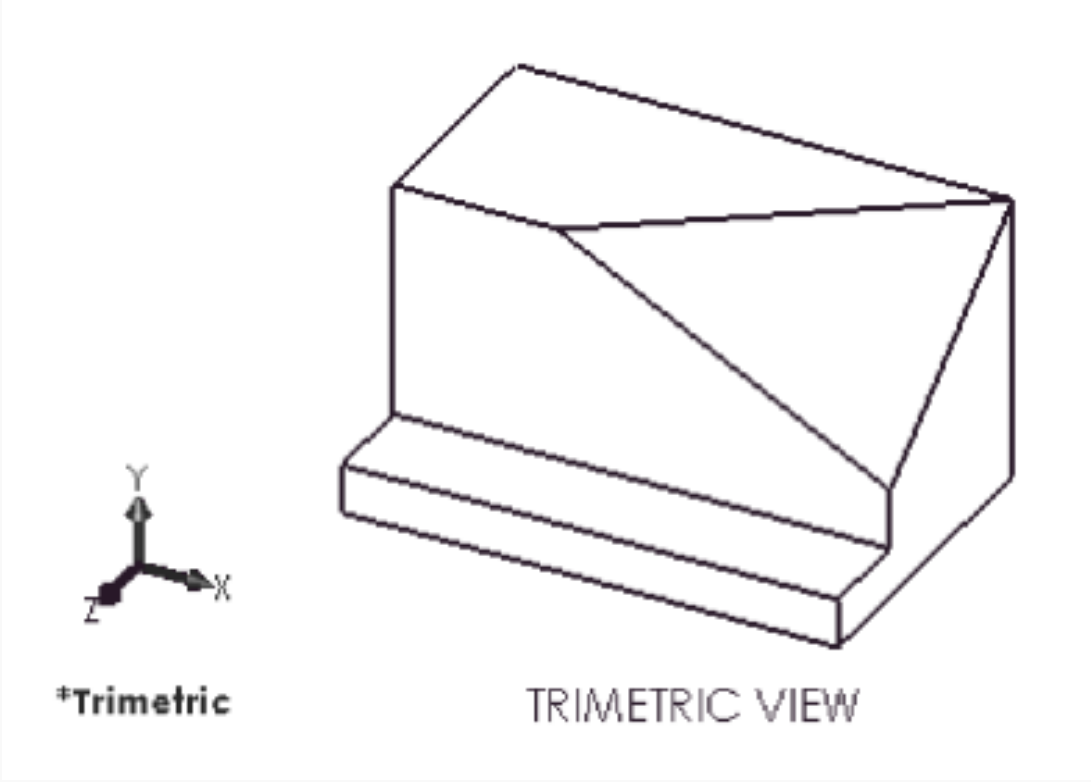
DIMETRIC VIEW



# Types of axonometric projections

**Trimetric**

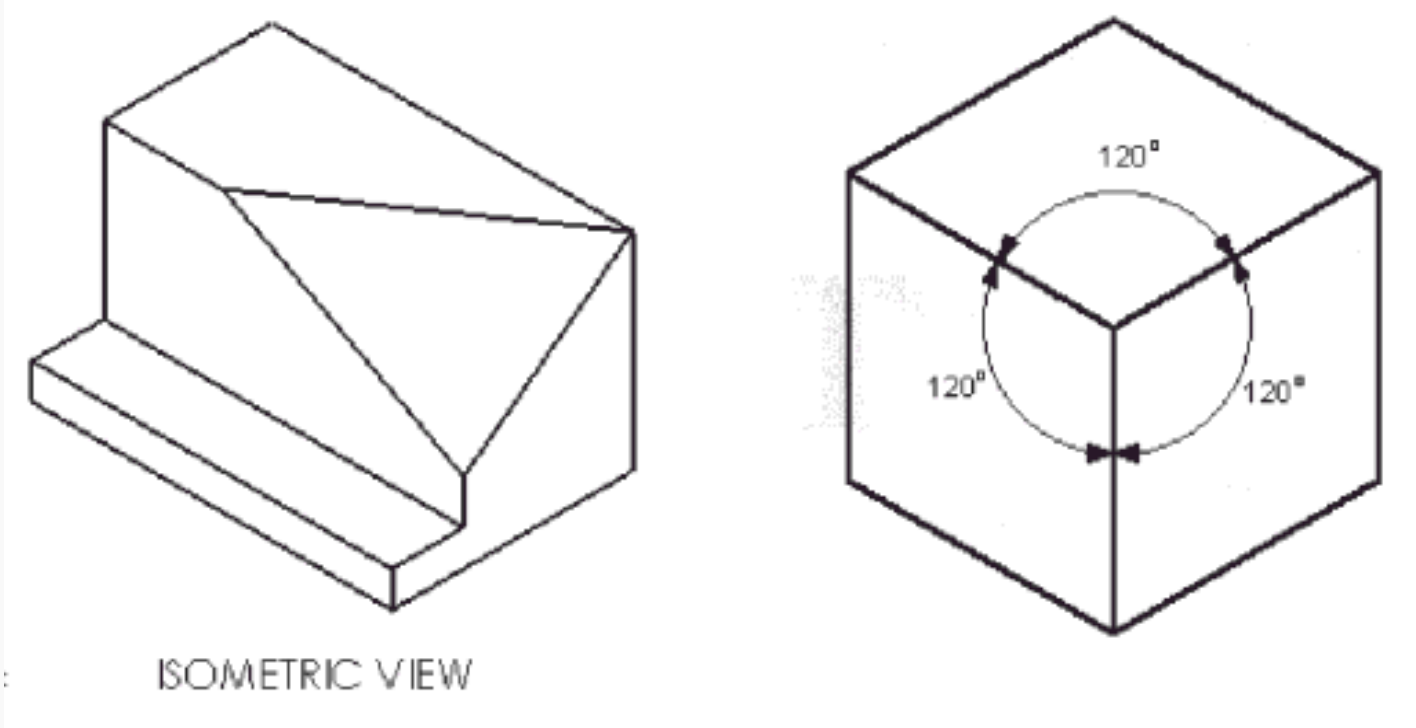
There are no equal angles between the coordinate axes



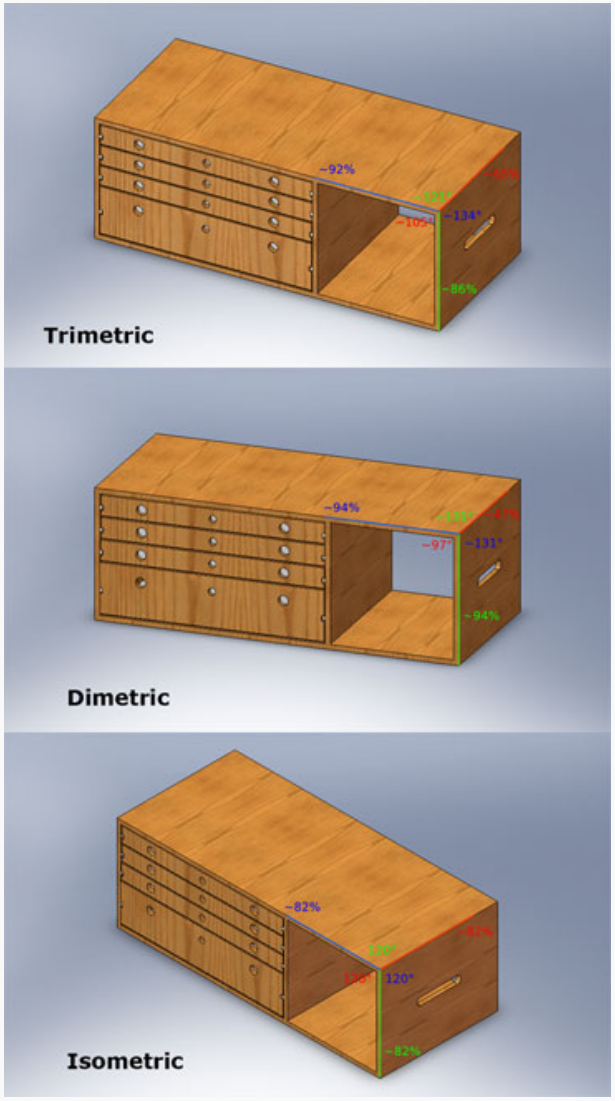
# Types of axonometric projections

**Isometric**

All the angles between the coordinate axes are equal (120°)

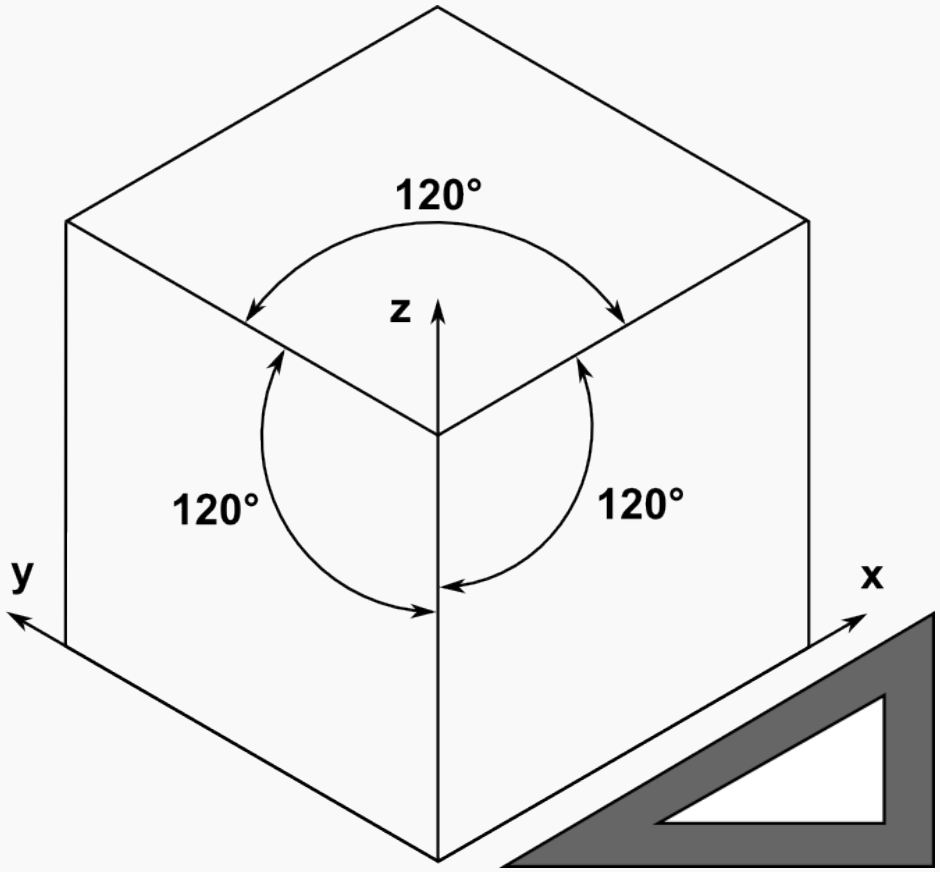


# Comparing axonometric views




http://www.untoldentertainment.com/blog/img/2009_09_22/axonometric_projections.jpg

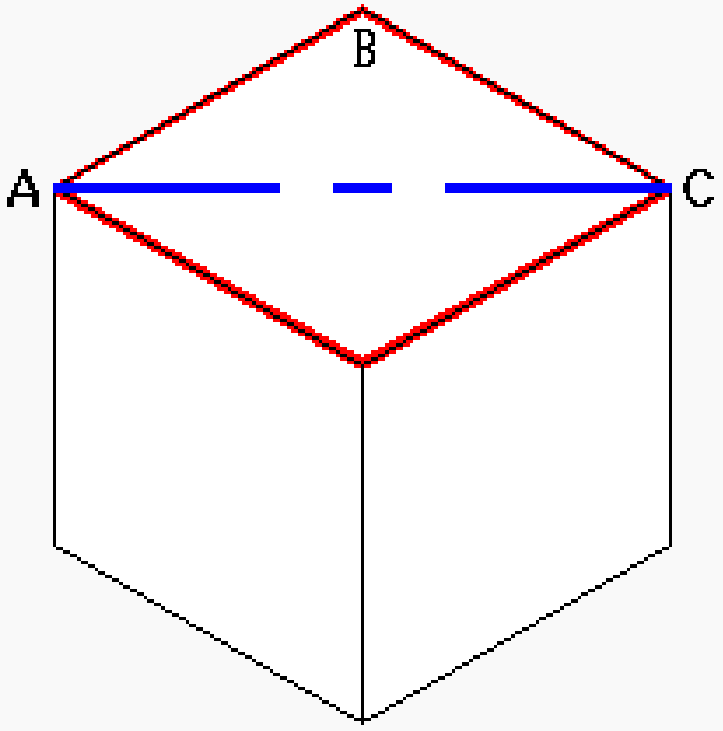
# Isometric projection – a closer look

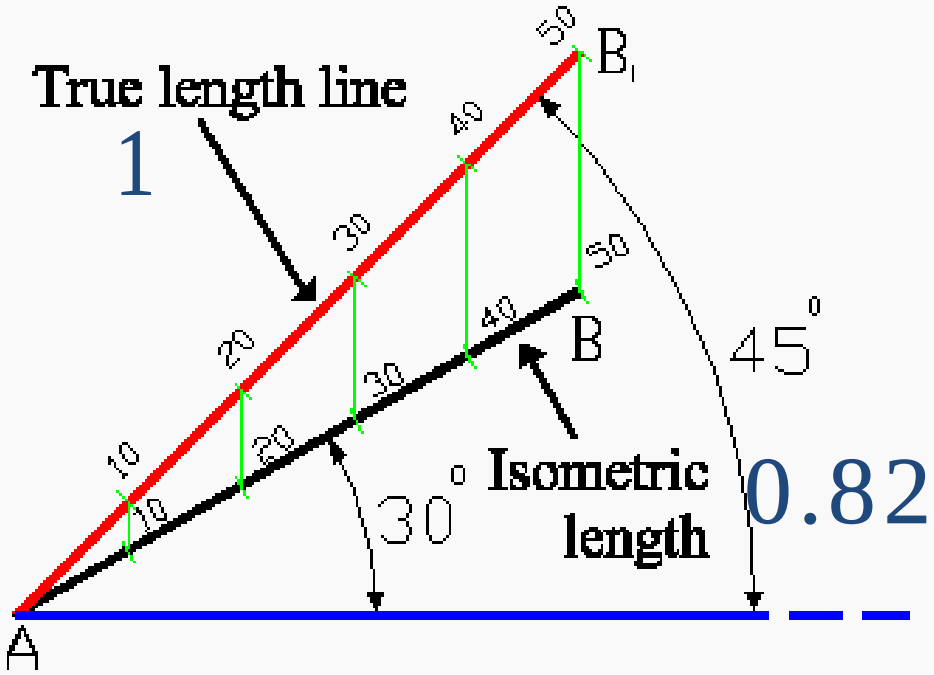



What is the true angle between the axes?

Do the sides shown represent the true lengths of the cube sides?

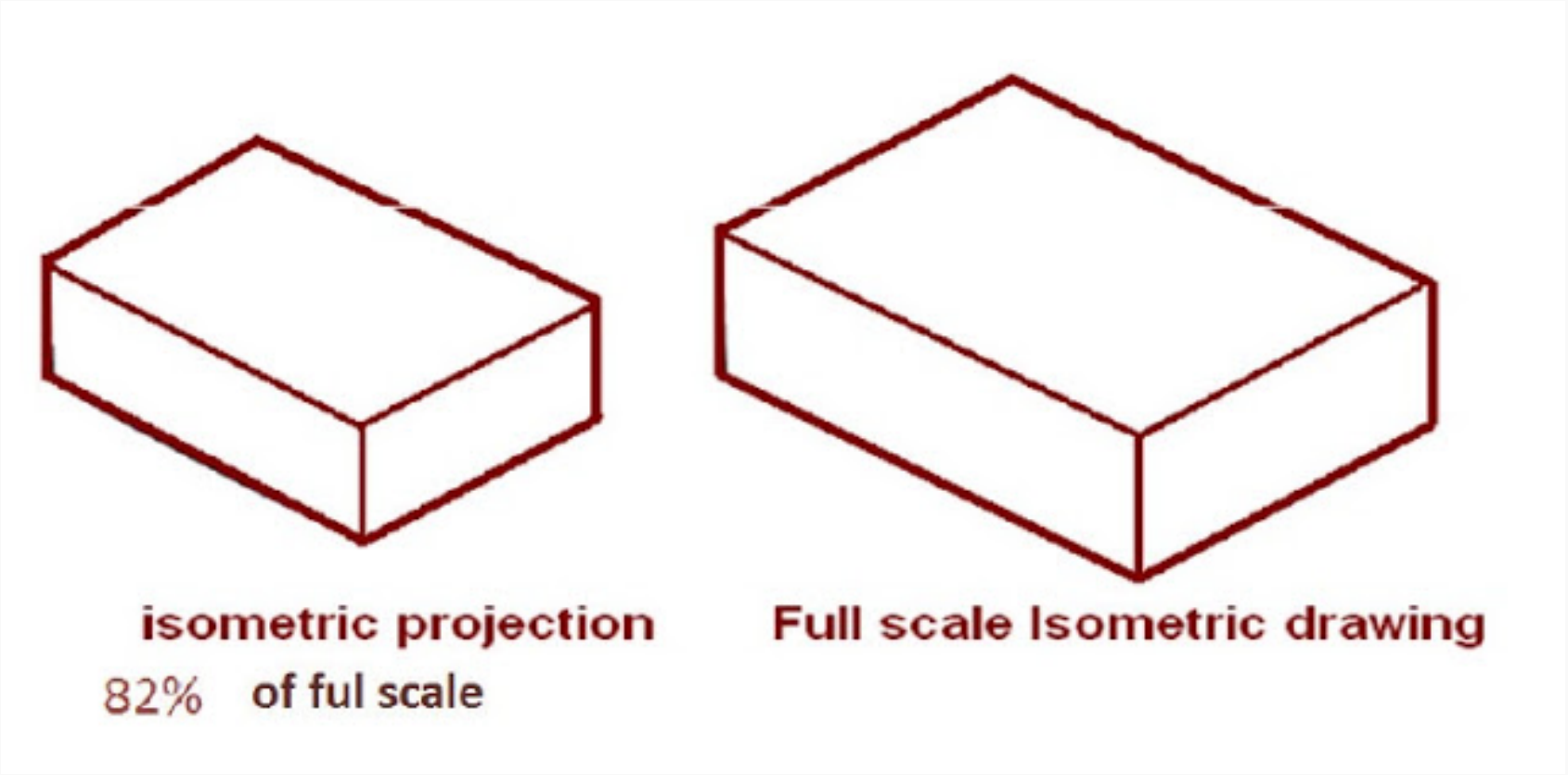
# Isometric projection – a closer look



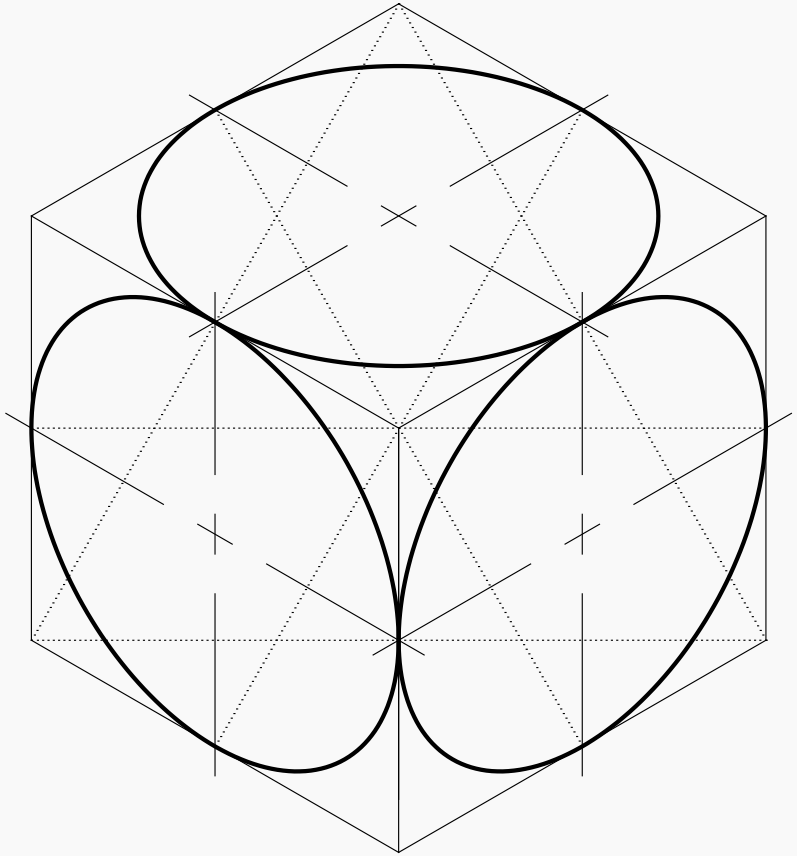

What is the <u>true</u> length of the cube sides?

# Isometric projection versus drawing

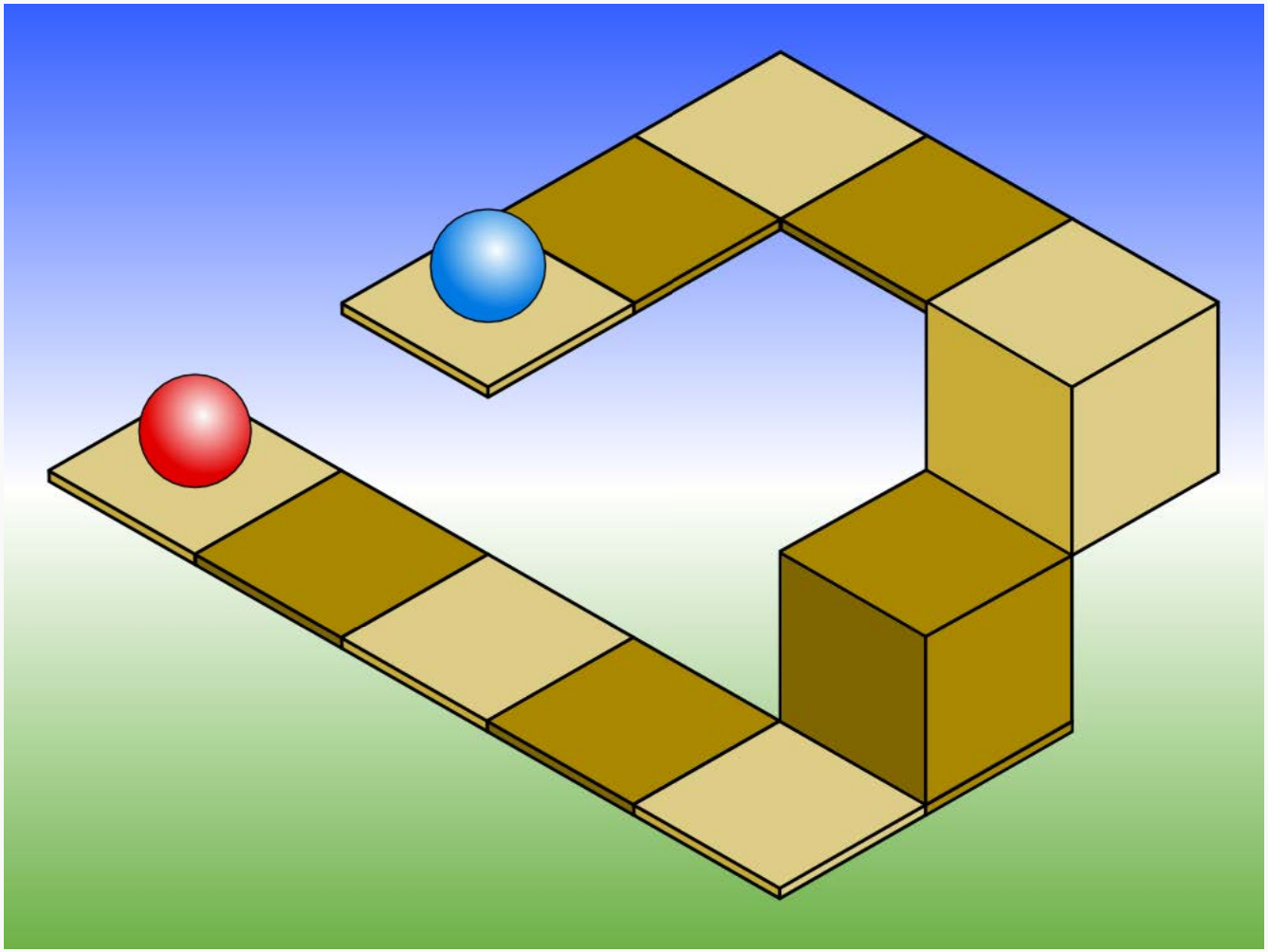


# Circles in isometric drawings

- Circles cannot be transferred directly to the isometric drawing. As the object is rotated to view it as isometric, holes and cylindrical features also rotate and appear as ellipses rather than true circles

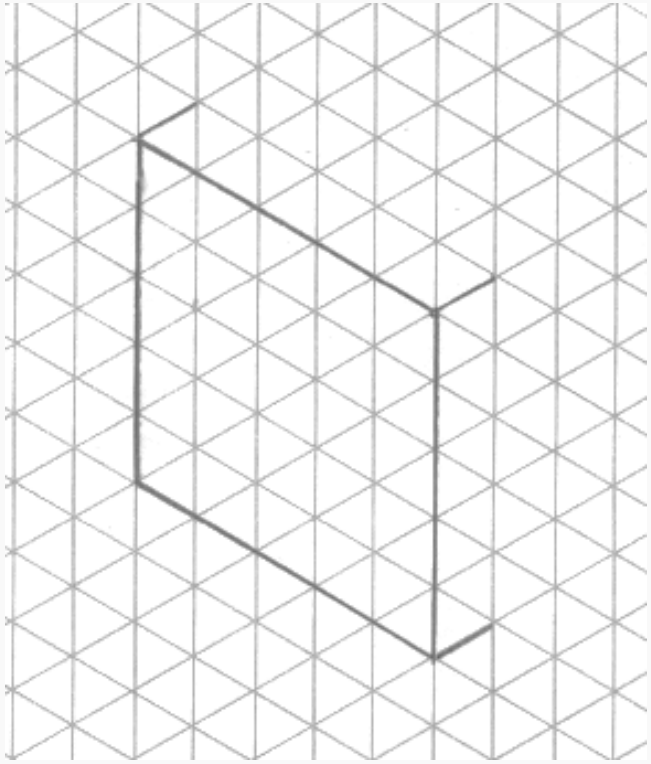


# Isometric Limitations

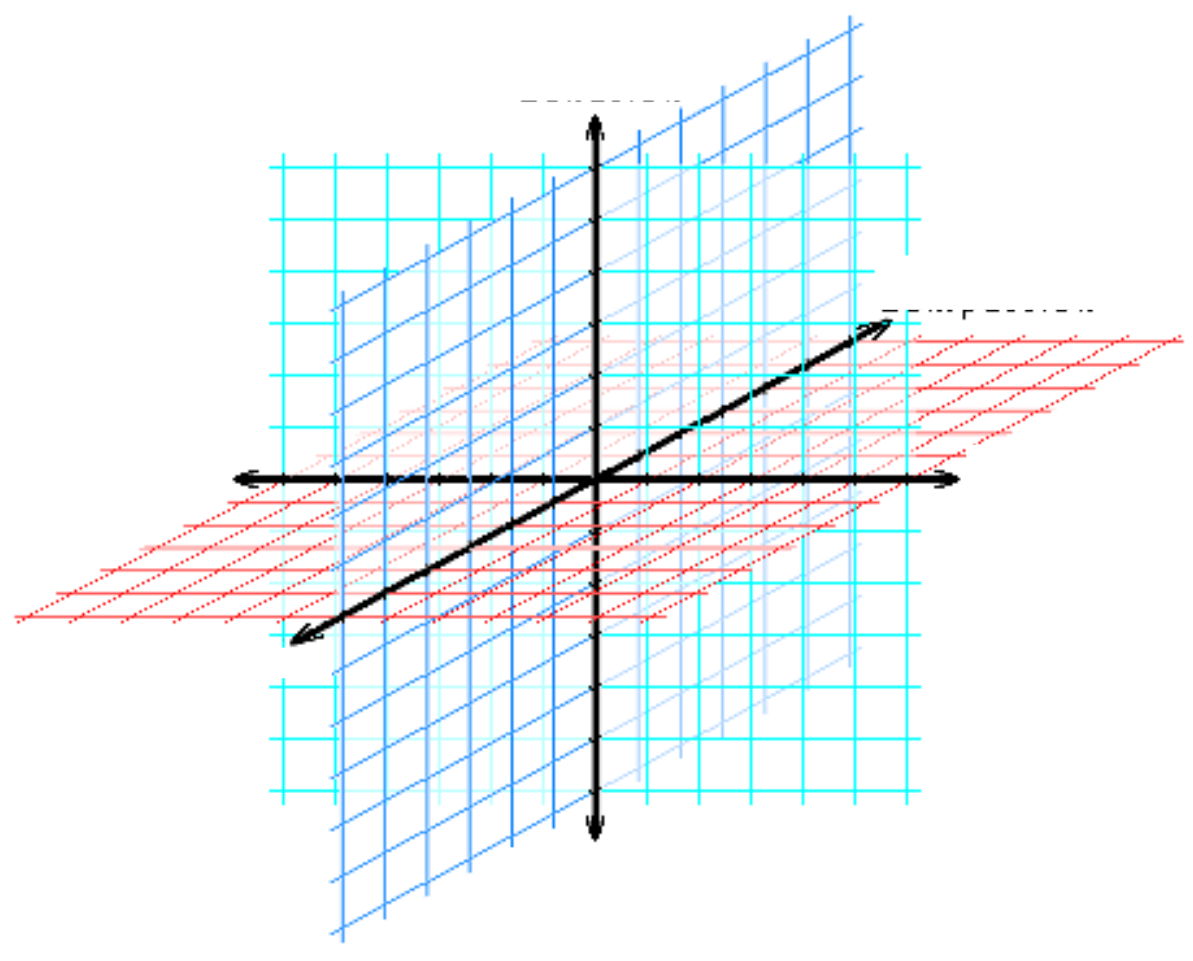


# Exercise 1

Draw the isometric view of a cube with side lengths 25 mm (spacing between lines on your isometric paper is 5 mm). The “front” face is drawn for you below:



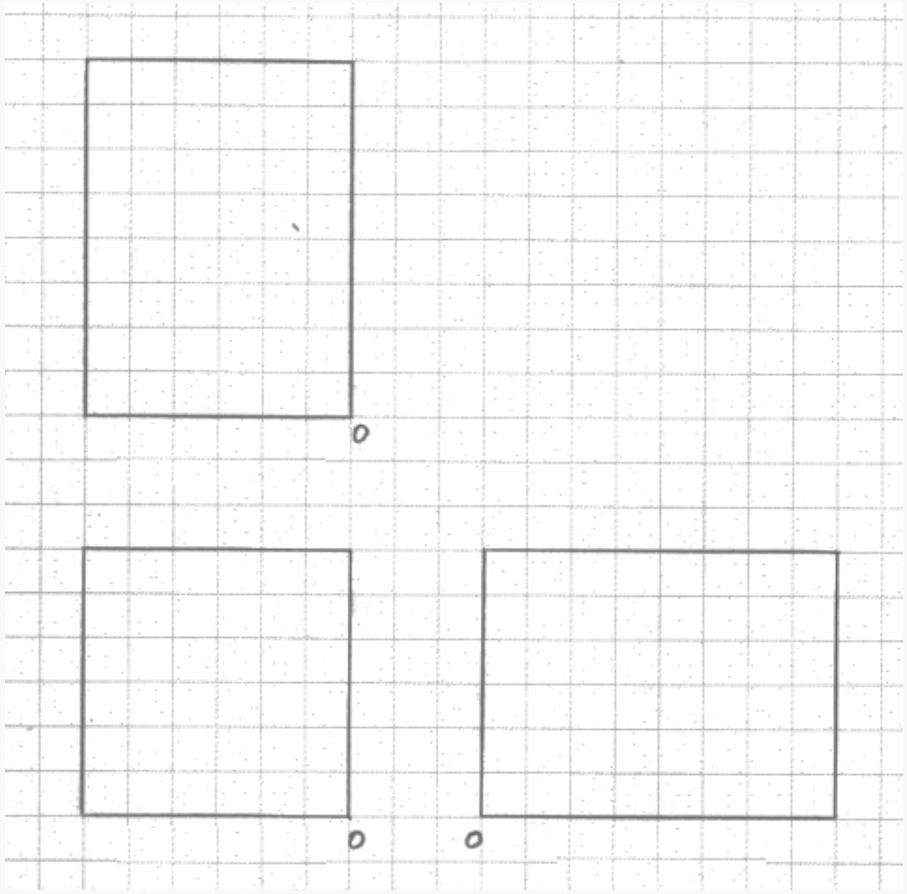
# Isometric drawing orientation



How do we know which octant the cube goes in?

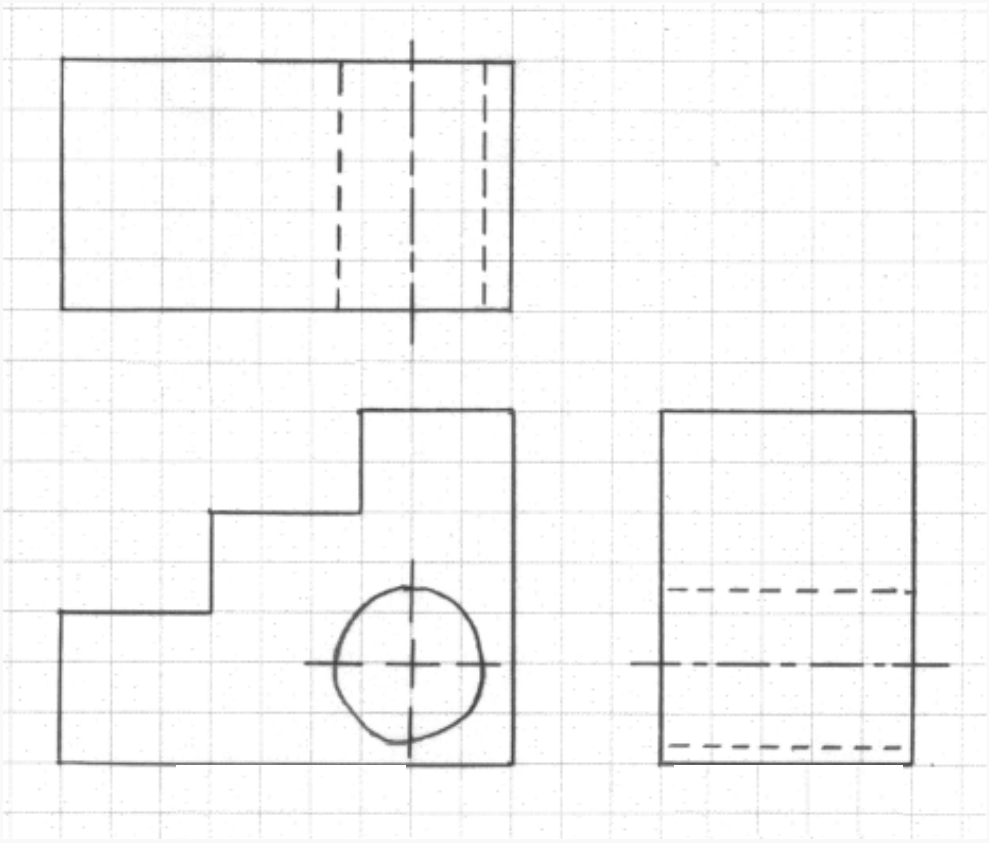
# Exercise 2

Draw the isometric view for the following object (spacing is 5 mm). Use point “O” for orientation:

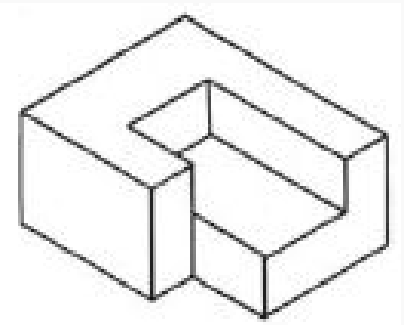


# Exercise 3

Draw the isometric view for the following object (spacing is 5 mm). Use point “O” for orientation:

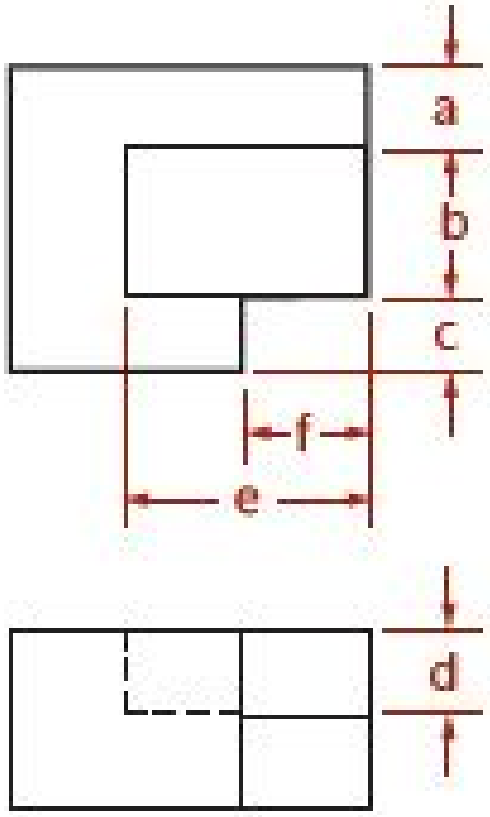


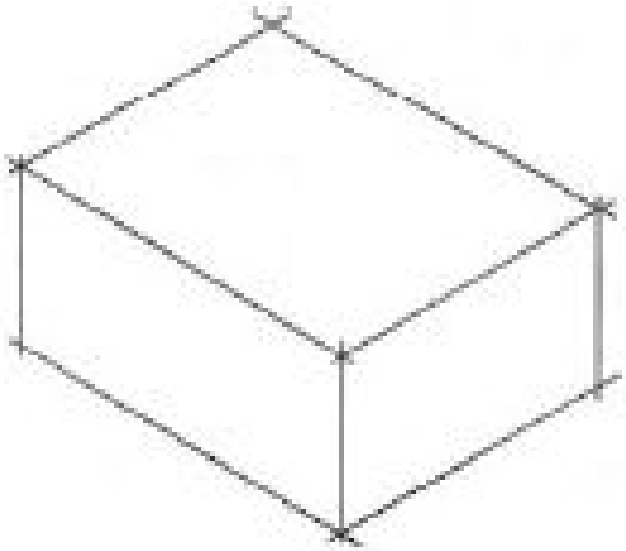
(final shape)



Let’s see how we got the answer using subtractive steps

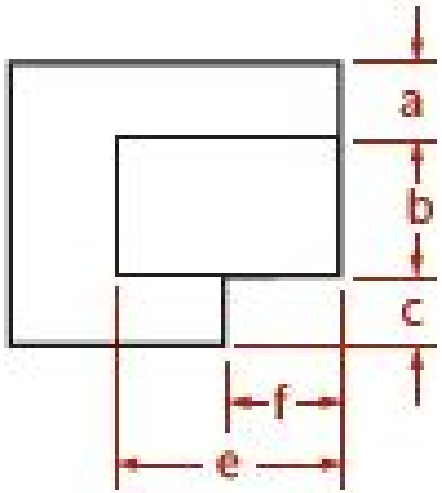
# Exercise 3 (cont.)

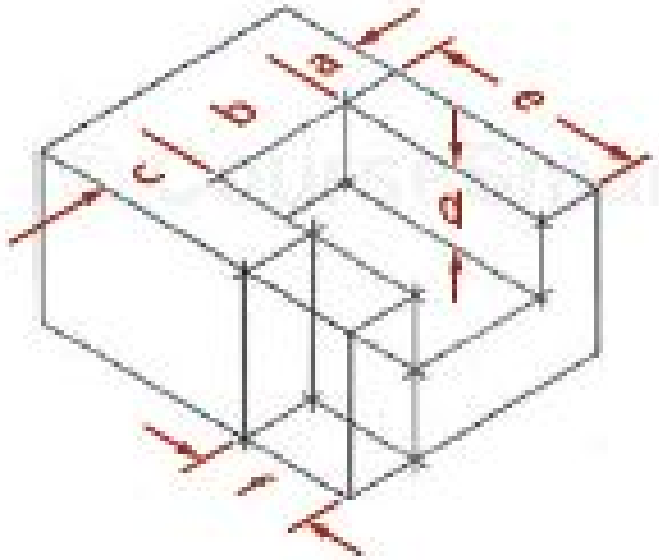


1. Lightly draw the overall dimensions of the box

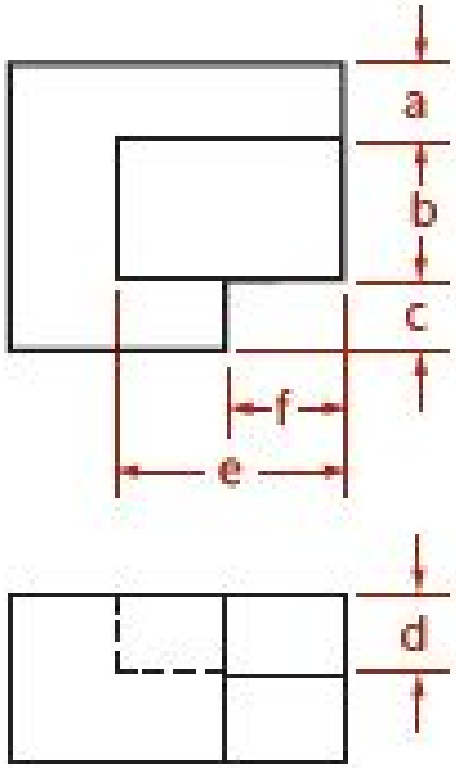
# Exercise 3 (cont.)

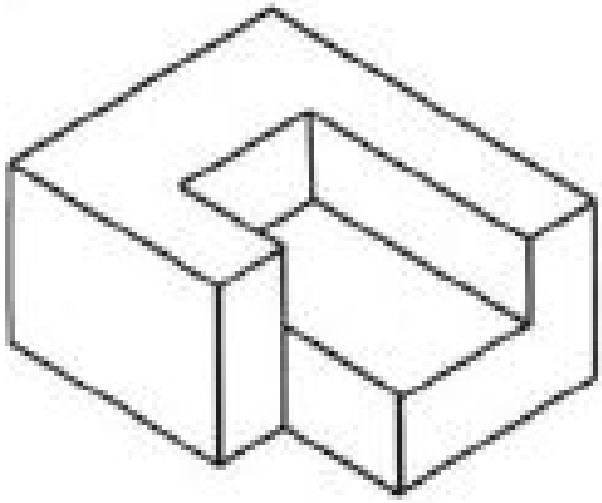



2. Draw the irregular features relative to the sides of the box

# Exercise 3 (cont.)

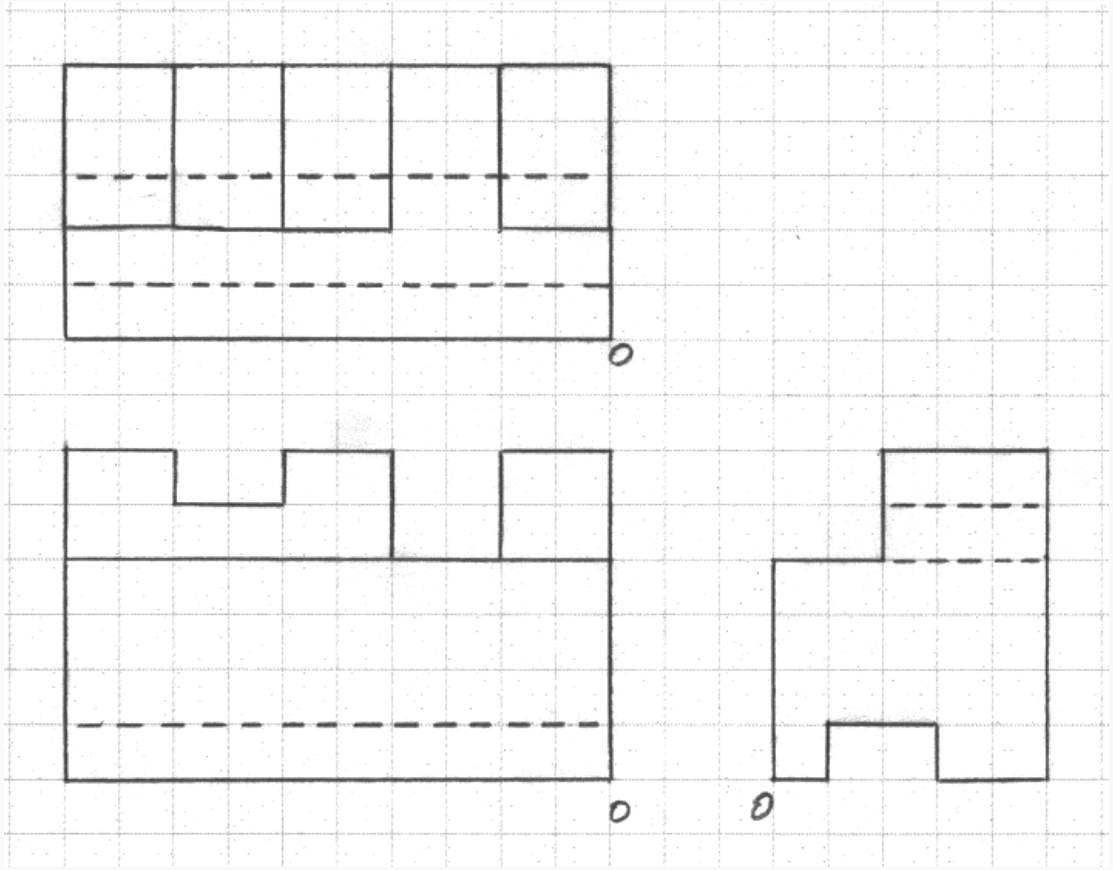


3. Darken the final lines

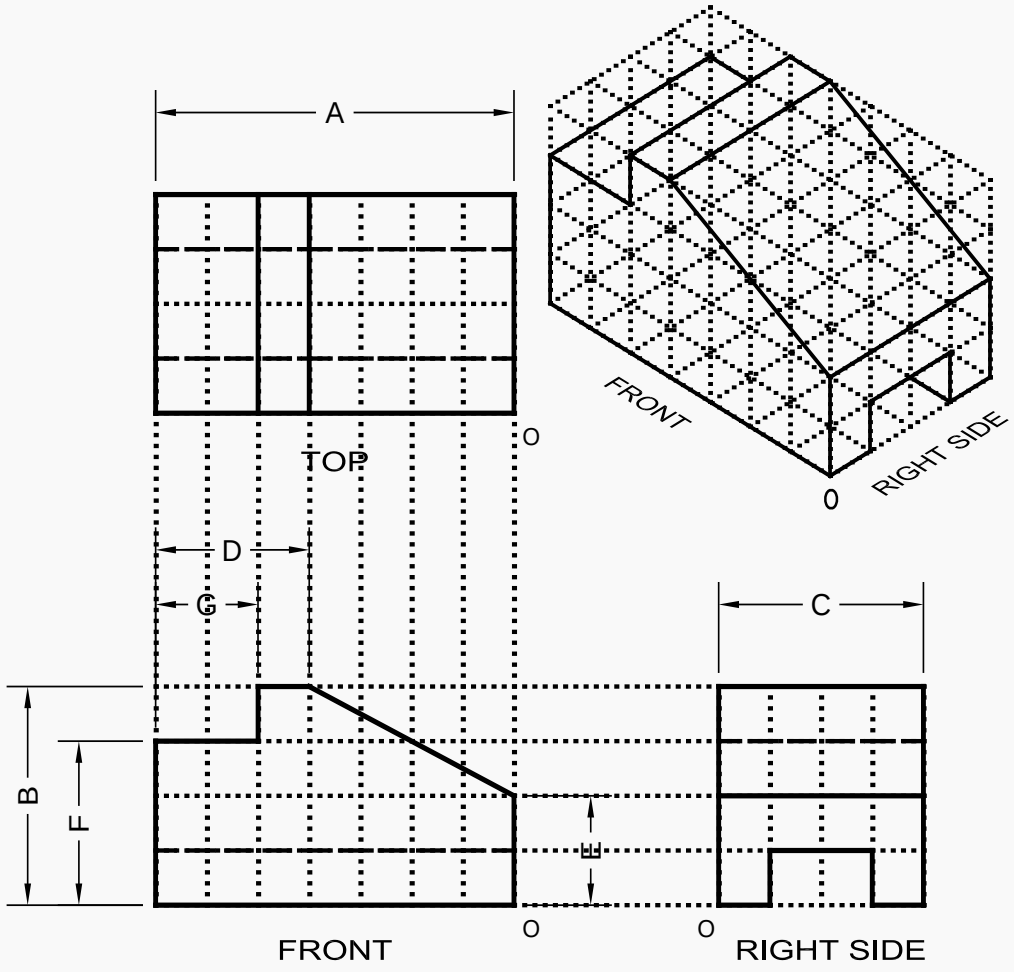
# Exercise 4

Draw the isometric view for the following object (spacing is 5 mm). Use point “O” for orientation:



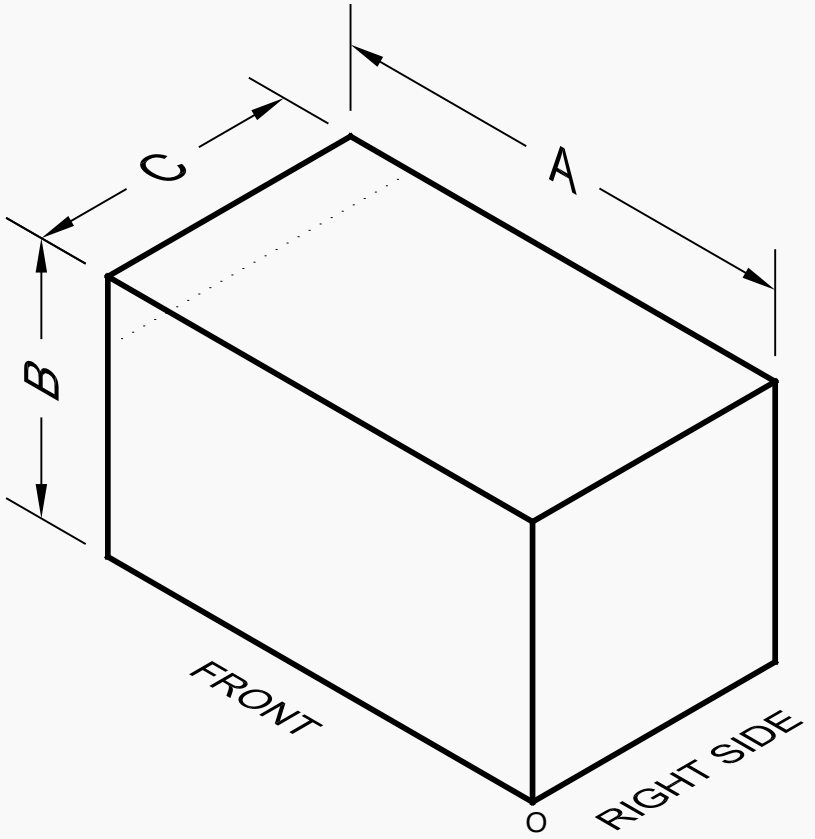
# Isometric drawing – inclined surfaces

- The object represented at right will be drawn as an isometric drawing using the following steps
- Note the orientation of the inclined surface and the measurements



# Isometric drawing – step 1

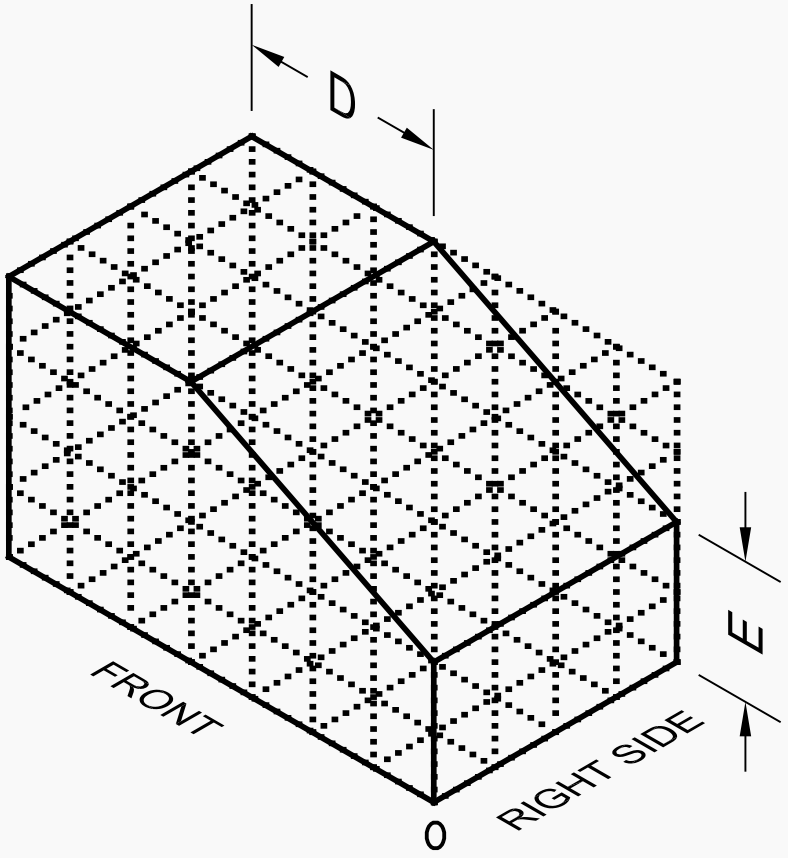
- **Step 1** – Sketching the object as if it were a complete cube without any cuts.
  - The measurements of overall Width (A), Height (B) and Depth (C) are transferred from the orthographic to the isometric by counting grid spaces




Step 1

# Isometric drawing – step 2

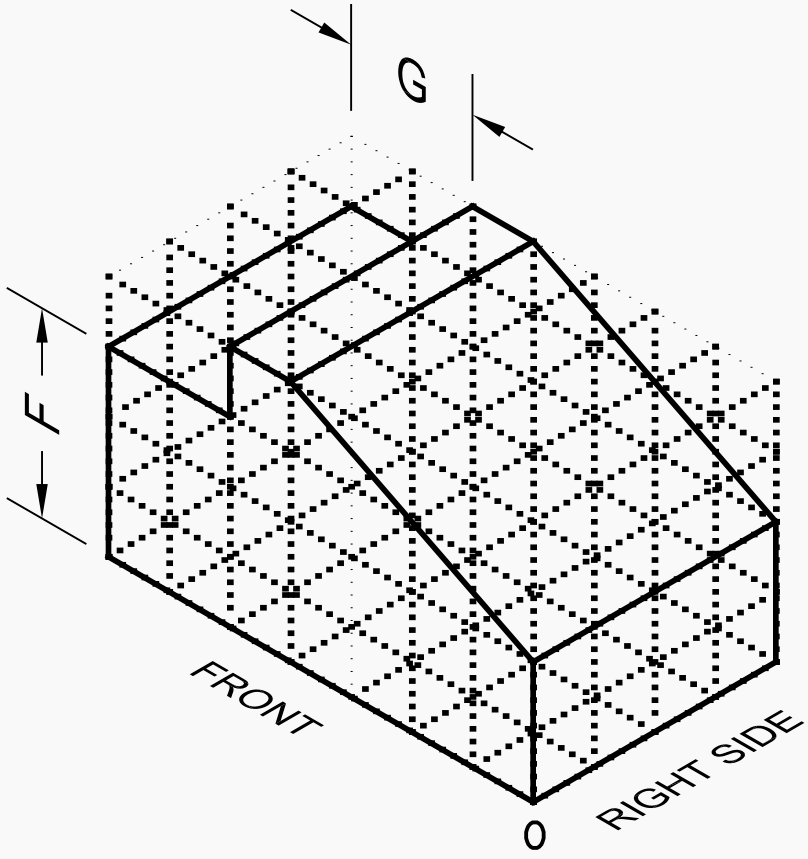
- **Step 2** – The angle of the inclined surface cannot be transferred directly. Locate the corners of the inclined surface and then draw lines to connect the corners
- Notice that edges that are parallel in the orthographic views will also be parallel in the isometric drawing




Step 2

# Isometric drawing – step 3

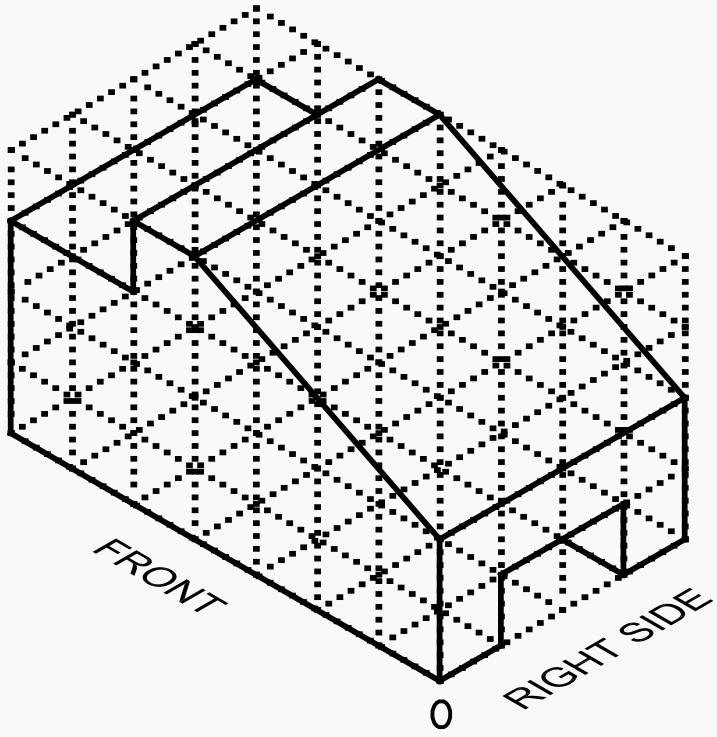
- **Step 3** – Add the rectangular cut across the left top edge. Notice that the rear of the edge of the cut disappears behind the raised portion of the block.




Step 3

# Isometric drawing – step 4

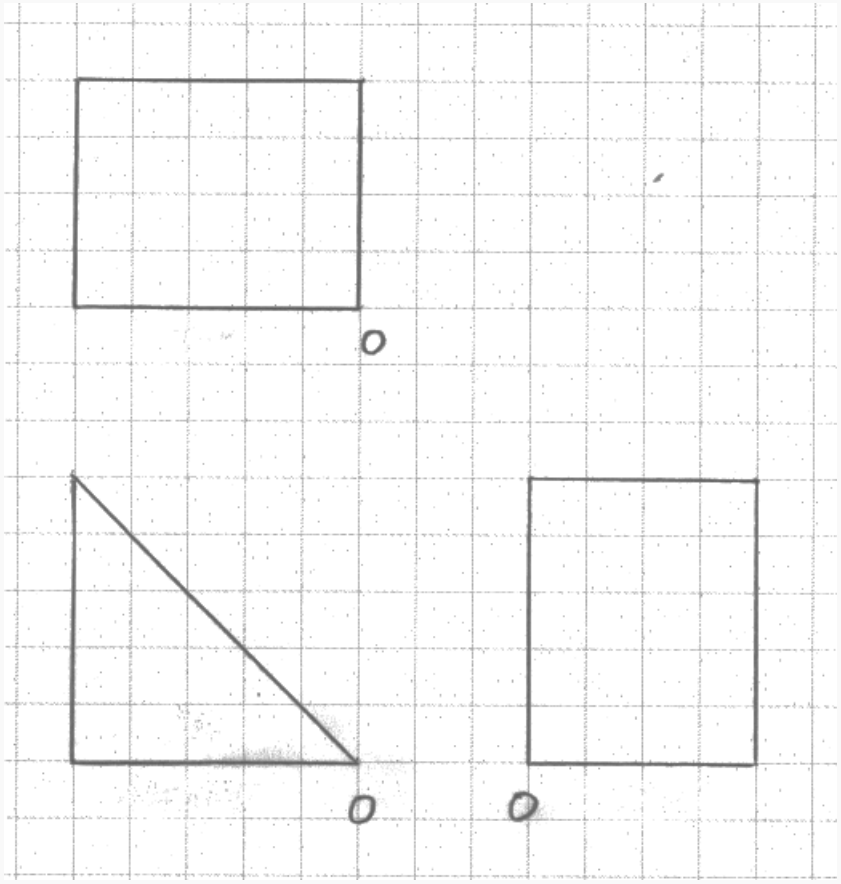
- **Step 4** – Add the rectangular cut across the left top edge. Notice that the rear of the edge of the cut disappears behind the raised portion of the block.




Step 4

# Exercise 5

Draw the isometric view for the following object (grid spacing shown is 5 mm). Use point “O” for orientation:



# Exercise 6

Draw the isometric view for the following object (grid spacing shown is 5 mm). Use point “O” for orientation: