Isometric Sketches and Isometric Drawing

Week-06

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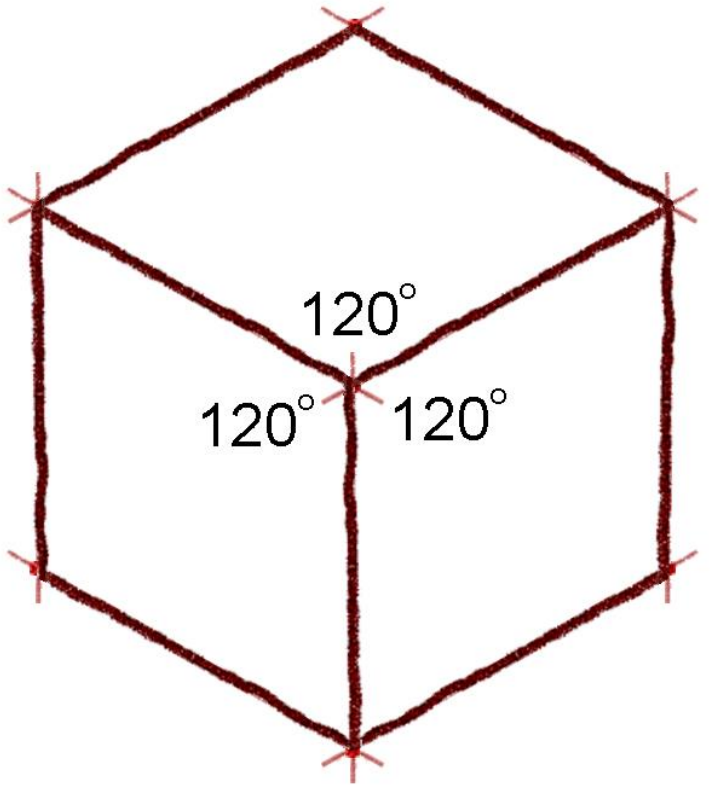
Isometric Pictorials

Isometric means *equal measure*.

Three adjacent faces on a cube will share a single point. The edges that converge at this point will appear as 120 degree angles or 30 degrees from the horizon line.

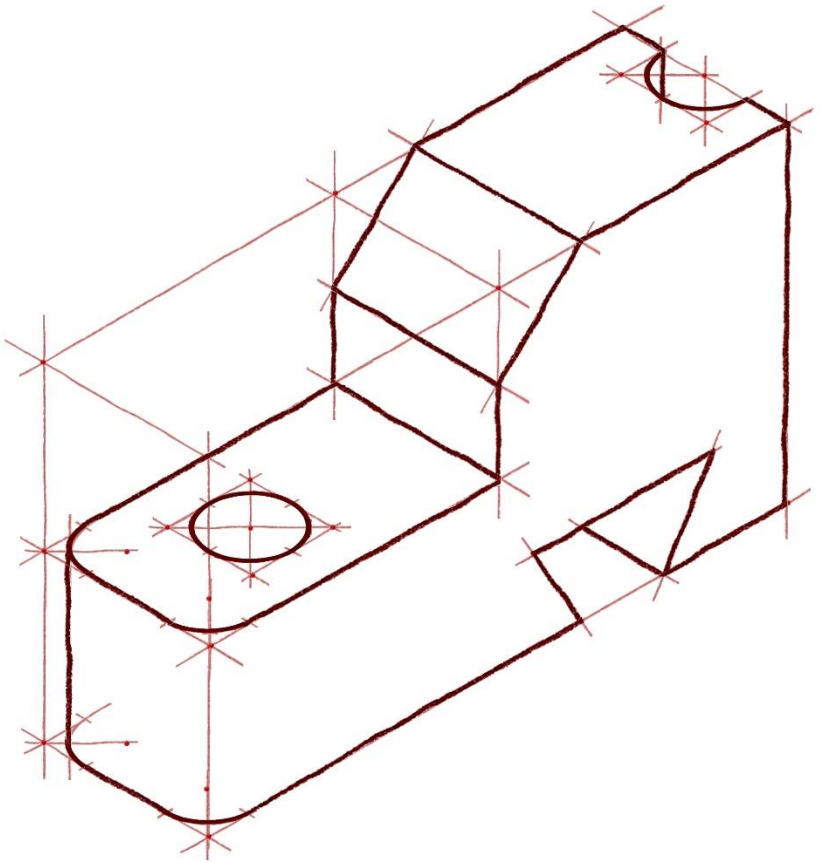
These three edges represent height, width, and depth.



The Box Method

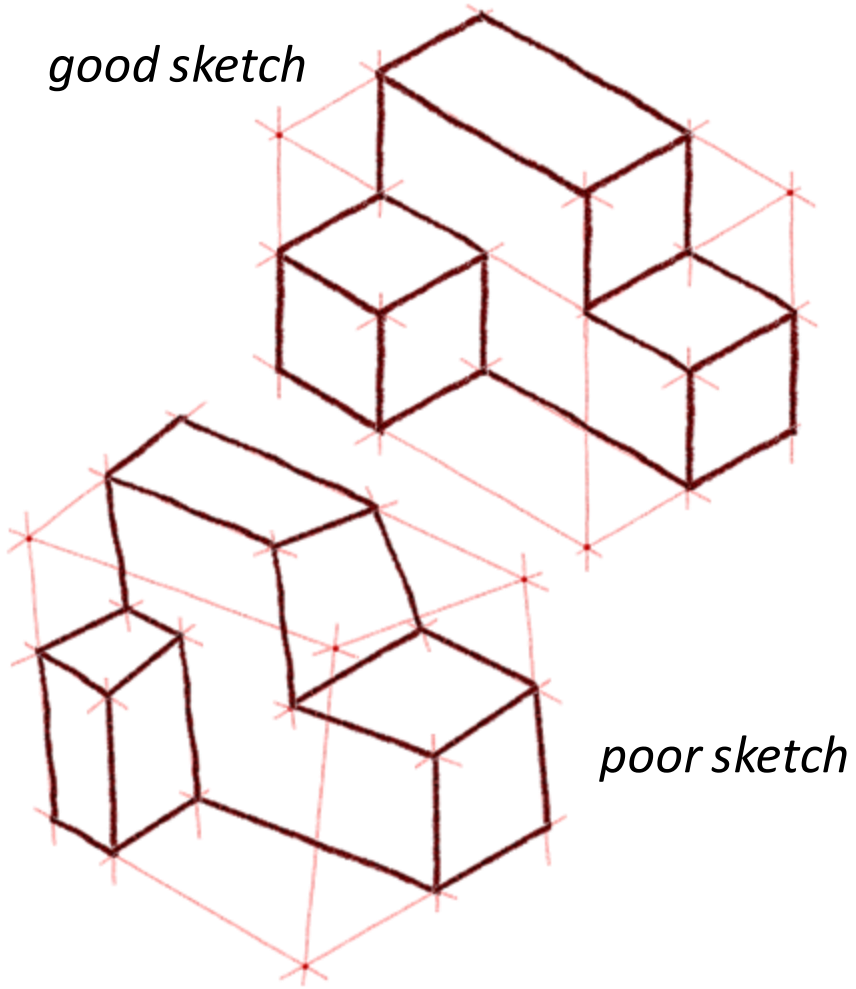
The *box method* is a technique used in sketching to maintain proportionality.

It starts with a sketcher envisioning an object contained within an imaginary box.



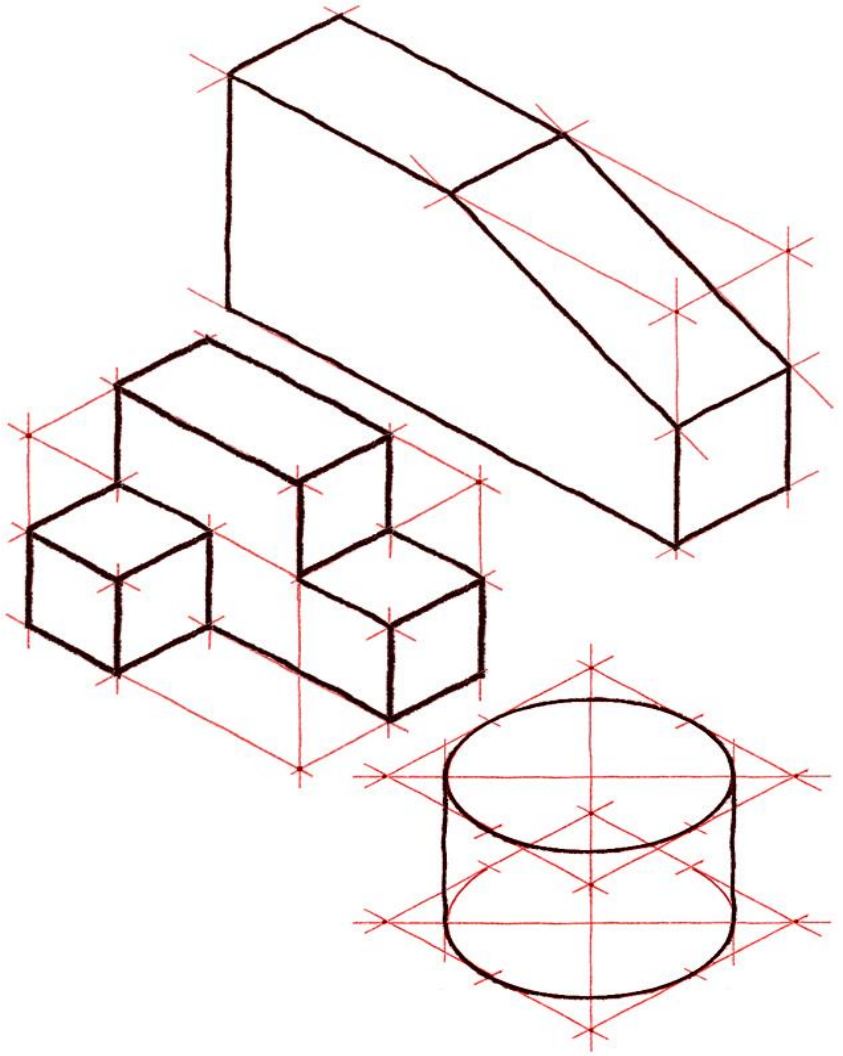
Proportion and Estimation

Good sketching requires a sense of proportion, and the ability to estimate size, distance, angles, and other spatial relationships.



Isometric Sketching

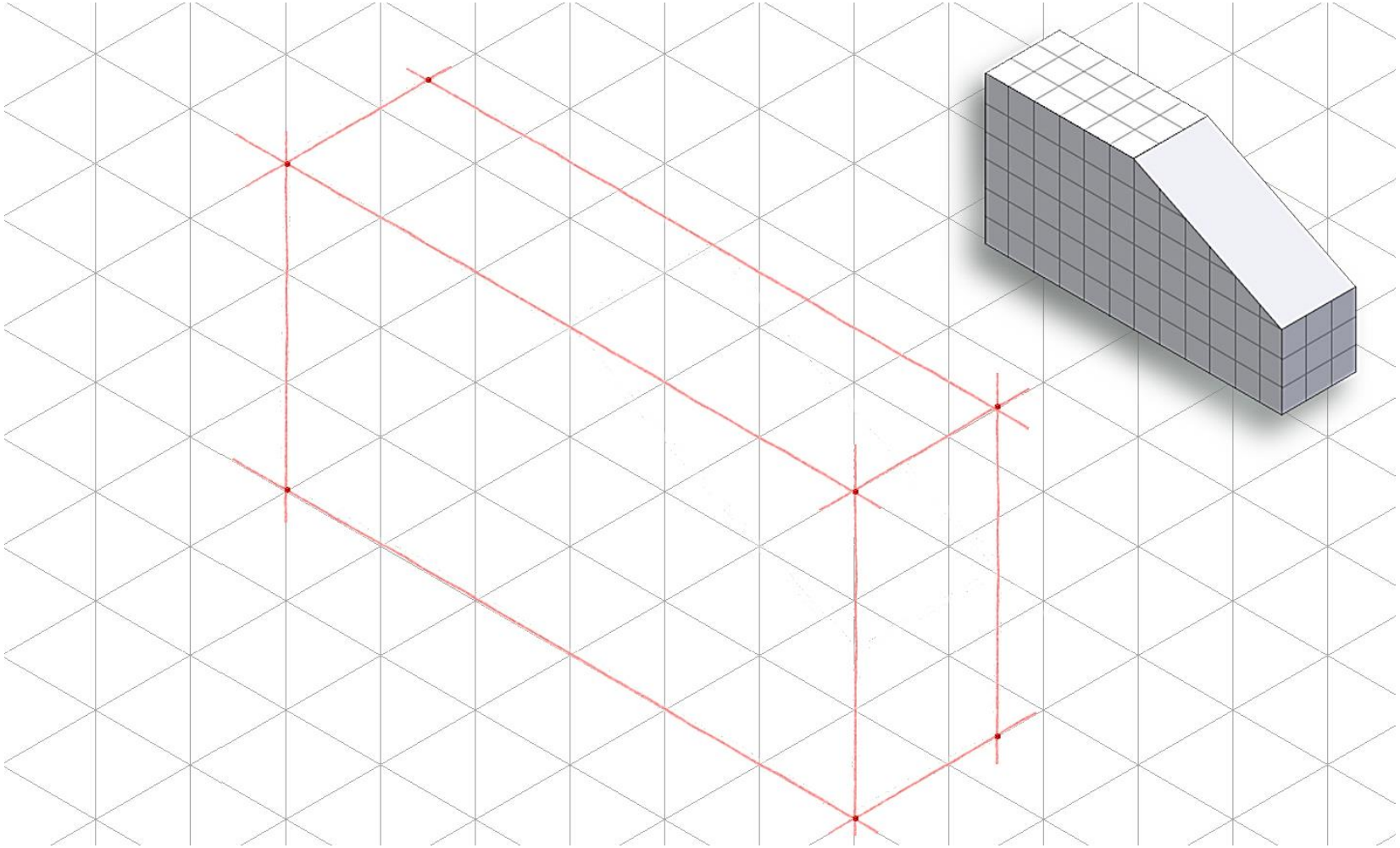
The following examples show the steps used to create isometric sketches of simple geometric objects, along with tonal shading techniques.



Isometric Sketches

Step #1: Layout the box within which the isometric view will occur using points and construction lines.

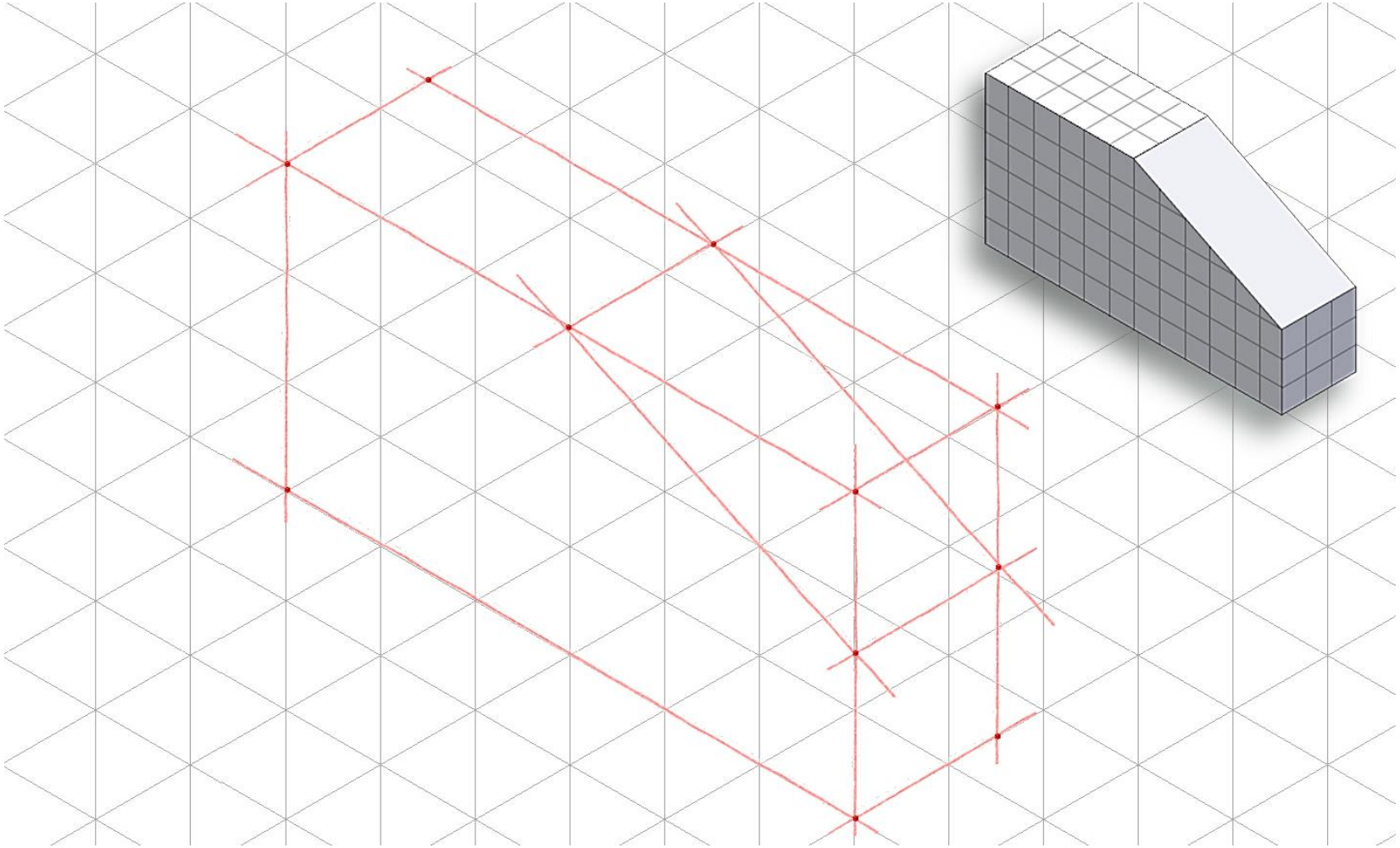
Step #1: Constructing The Box



Isometric Sketches

Step #2: Use points and construction lines to identify surfaces that are not parallel to the faces of the box.

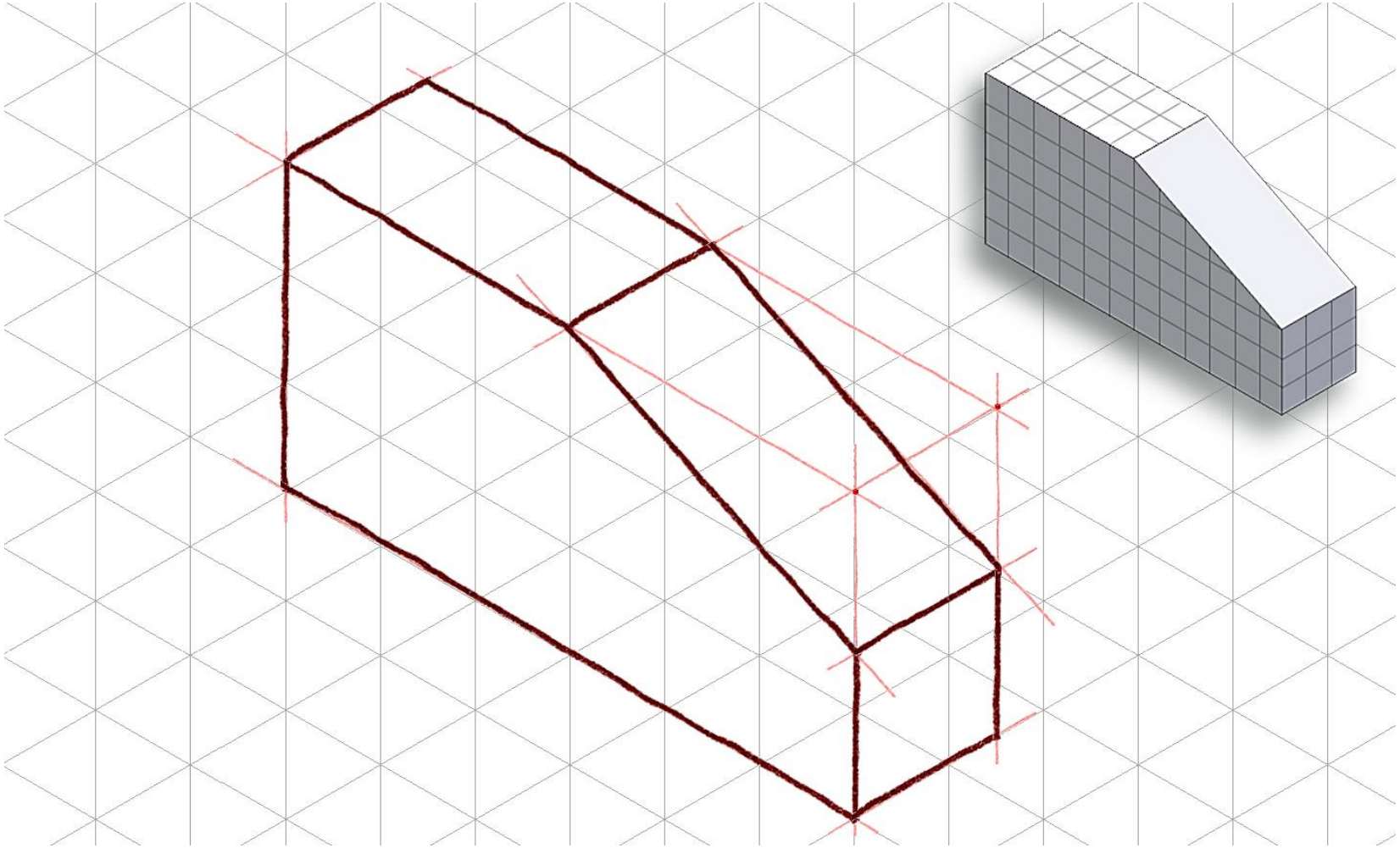
Step #2: Outside Faces



Isometric Sketches

Step #3: Trace out the visible edges of the part with thick, dark object lines.

Step #3: Object Lines

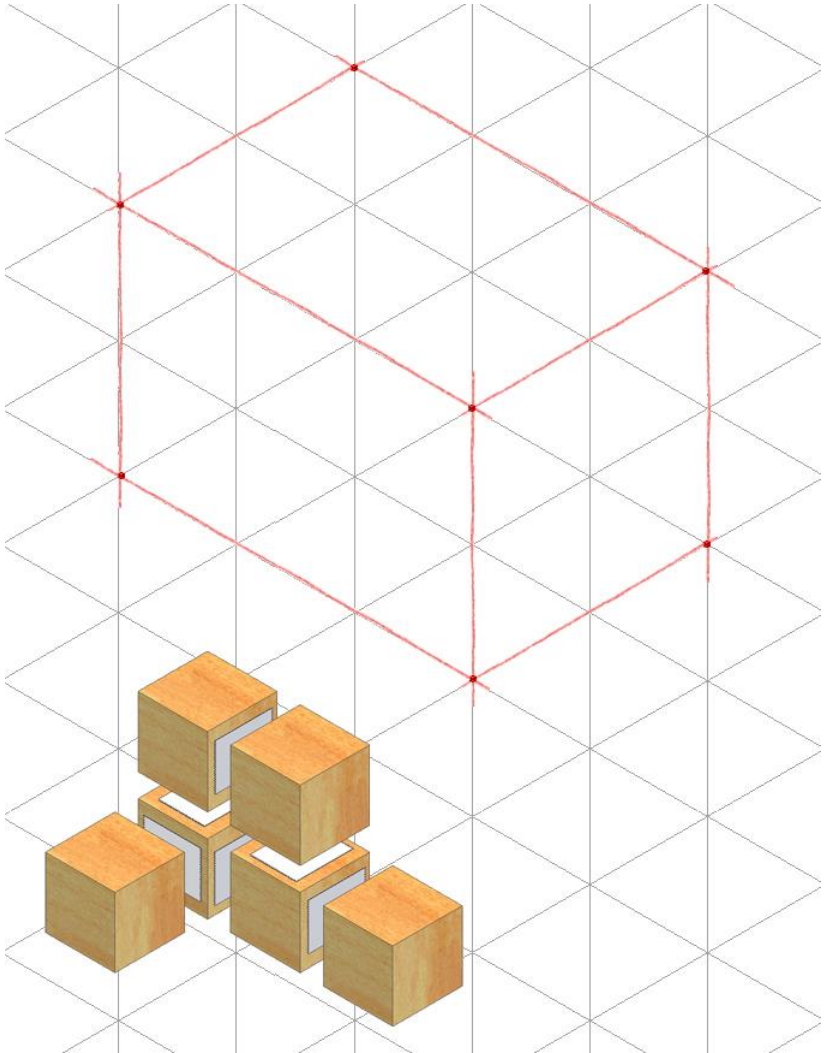


Step #1: Constructing The Box

Determine the overall dimensions of the object:

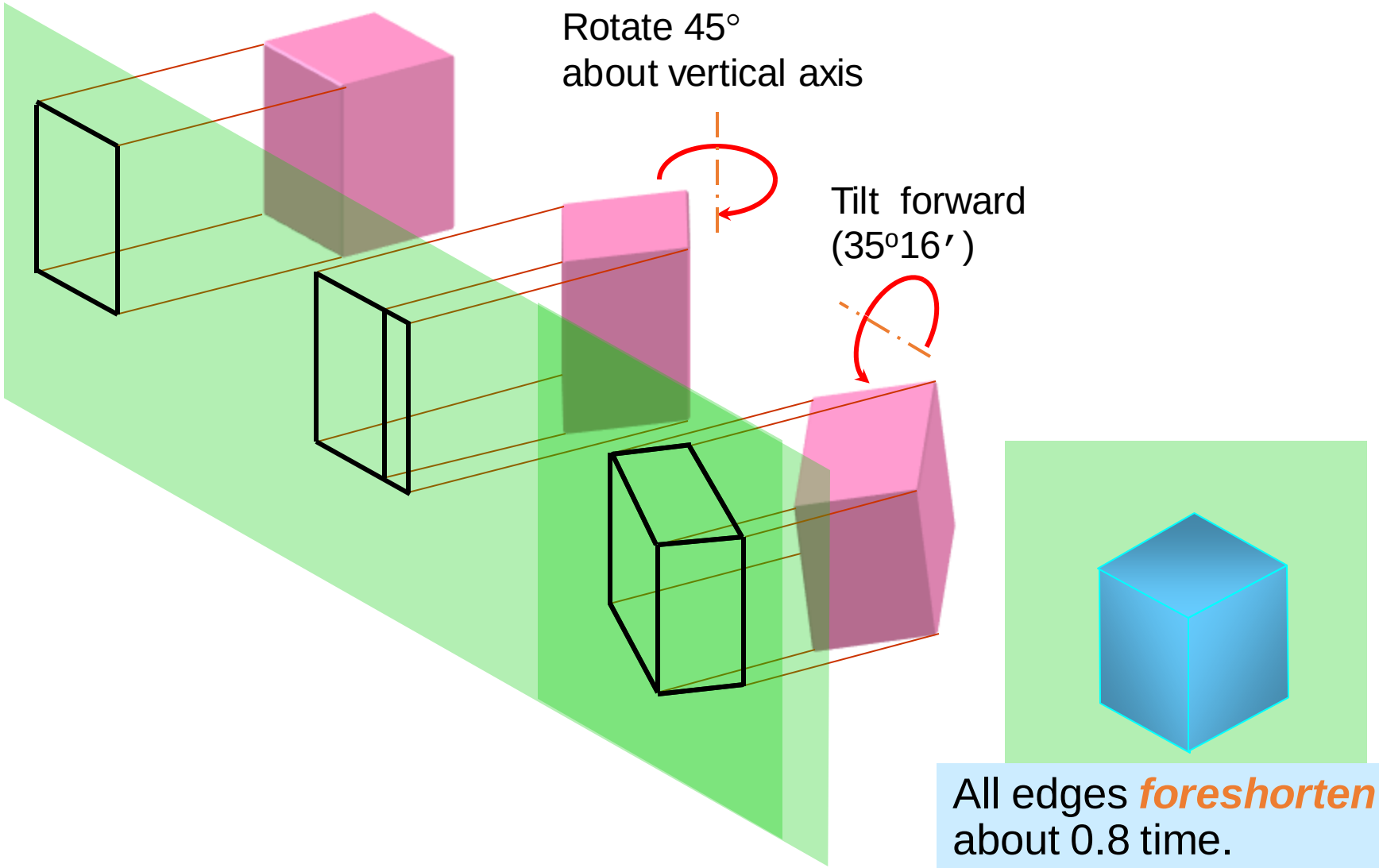
- 3 units wide
- 2 units tall
- 2 units deep

Use points and construction lines to layout the box.



Isometric Projection & Isometric drawing

Isometric Projection

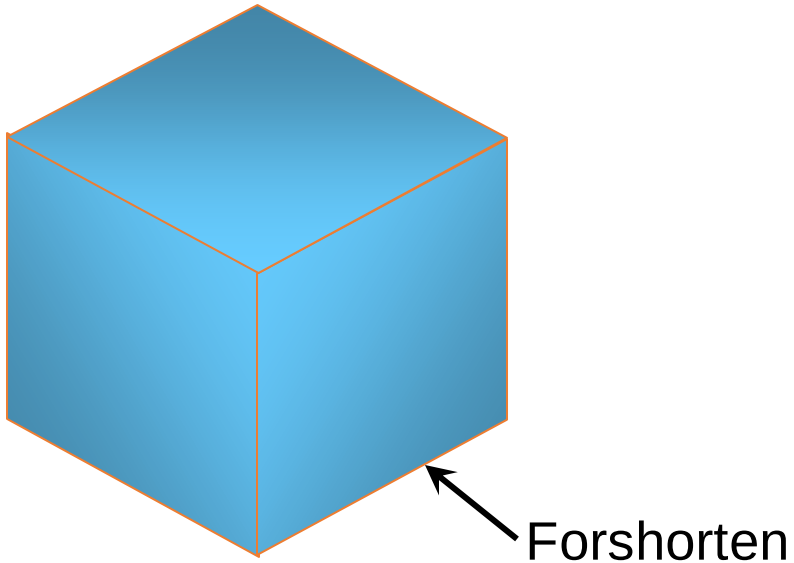


All edges ***foreshorten*** about 0.8 time.

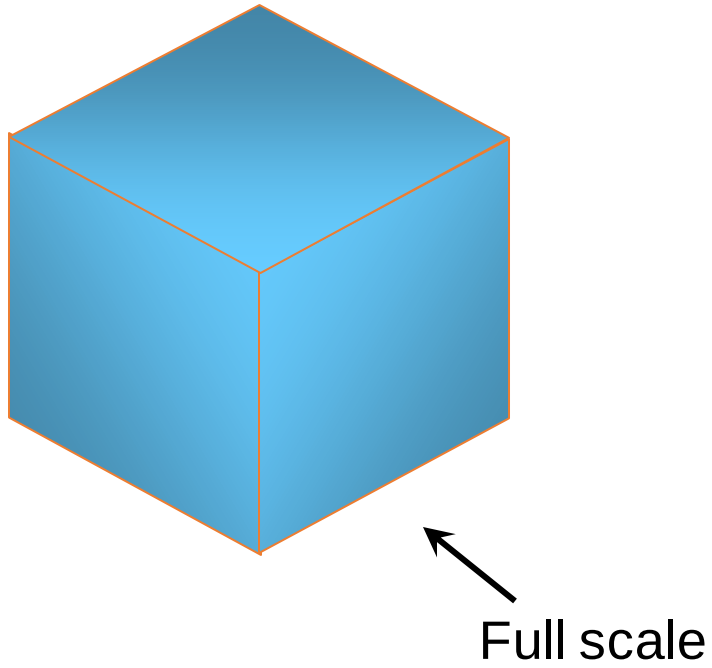
Isometric Drawing

Isometric drawing is a drawing drawn on an isometric axes using ***full scale***.

Isometric projection
(True projection)



Isometric drawing
(Full scale)



Isometric Sketching

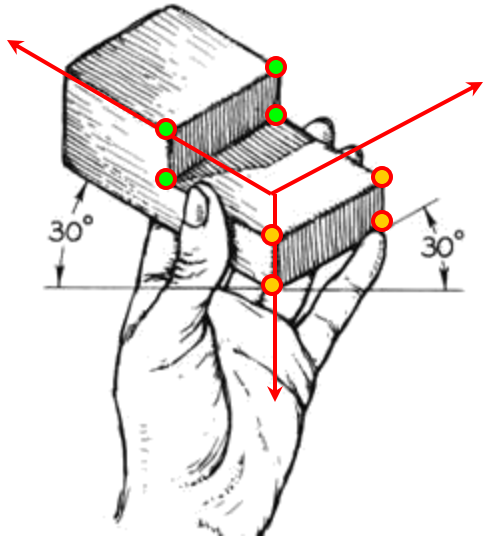
Sketch from an actual object

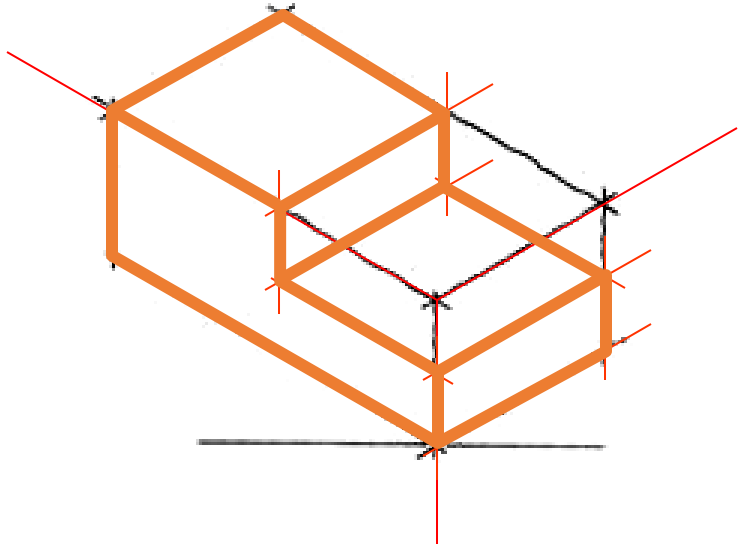
1. Place the object in the position which its shape and features are clearly seen.
2. Define an isometric axis.
3. Sketching the enclosing box.
4. Estimate the size an and relationship of each details.
5. Darken all visible lines.

Sketch from an actual object

STEPS

1. Positioning object.
2. Select isometric axis.
3. Sketch enclosing box.
4. Add details.
5. Darken visible lines.





Sketch from an actual object

STEPS

1. Positioning object.
2. Select isometric axis.
3. Sketch enclosing box.
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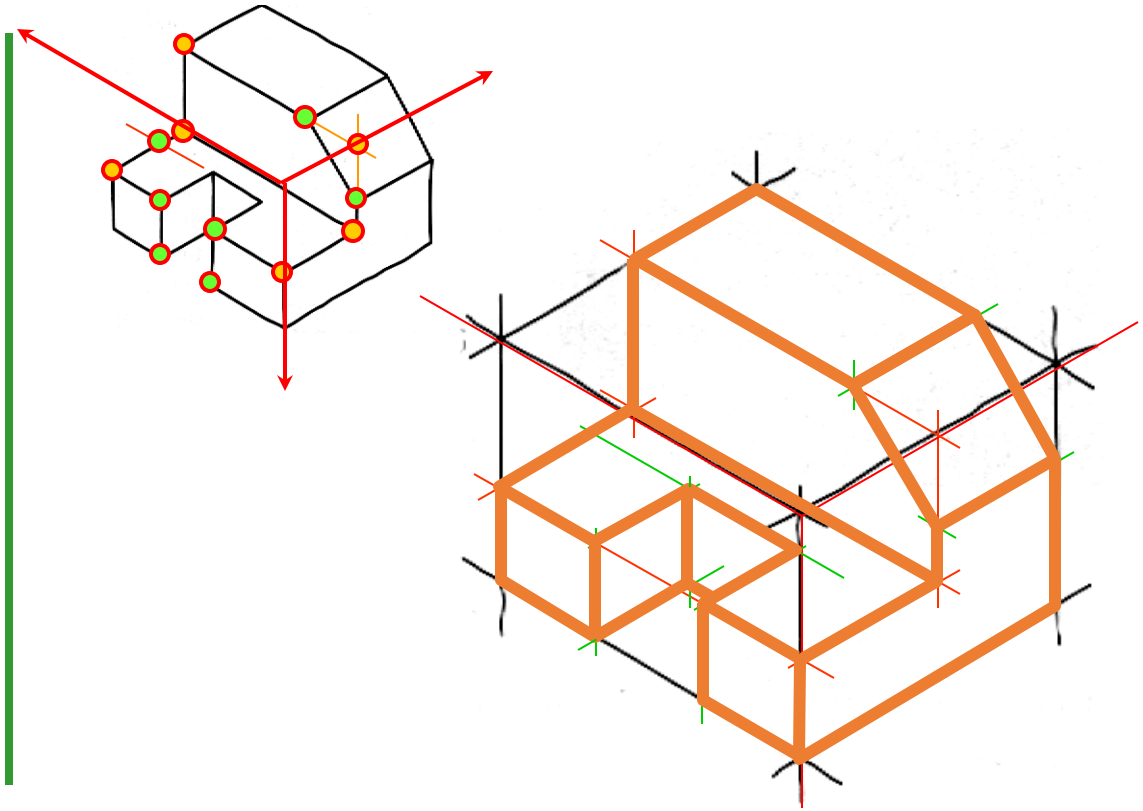
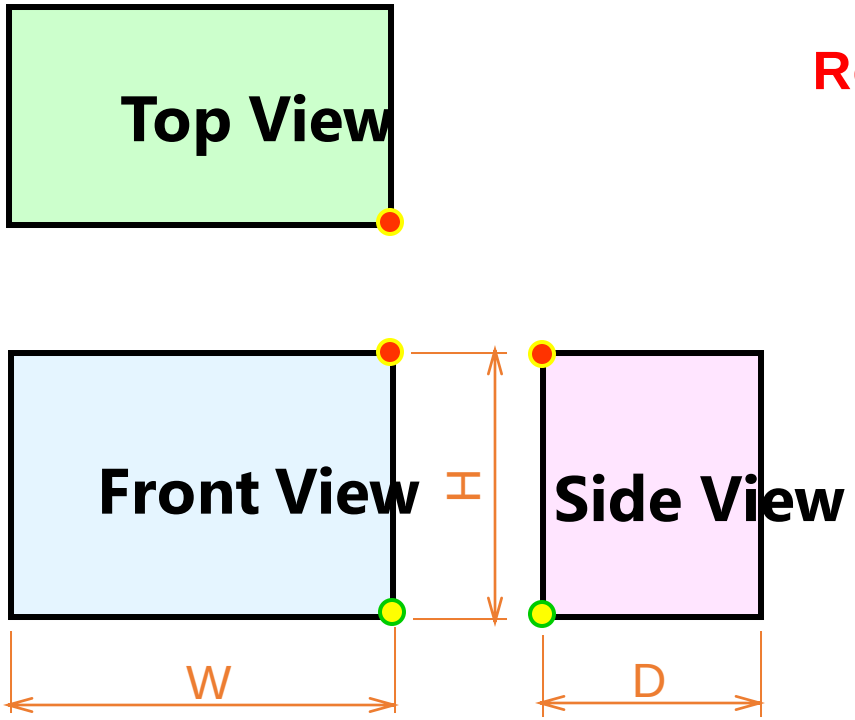


Note In isometric sketch/drawing), hidden lines are ***omitted*** unless they are absolutely necessary to completely describe the object.

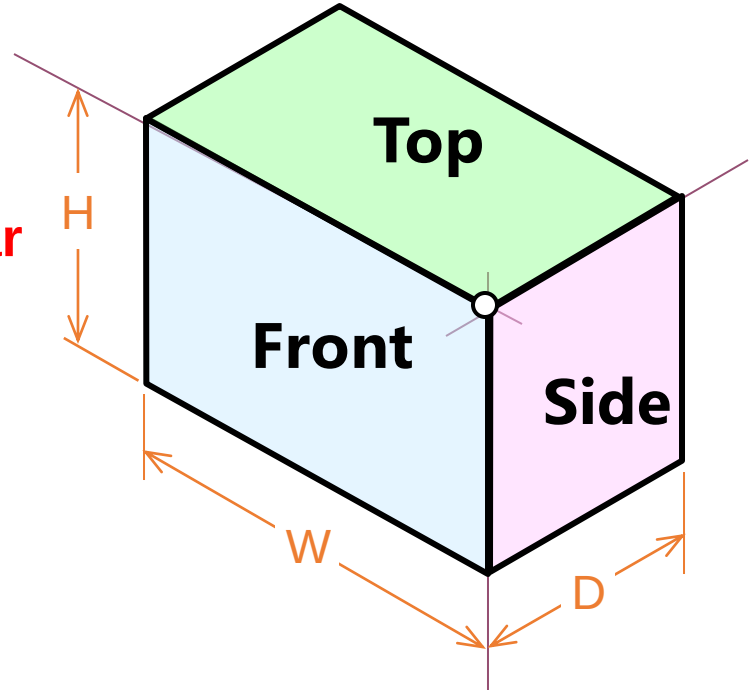
Sketch from multiview drawing

1. Interprete the ***meaning of lines/areas*** in multiview drawing.
2. Locate the lines or surfaces relative to isometric axis.

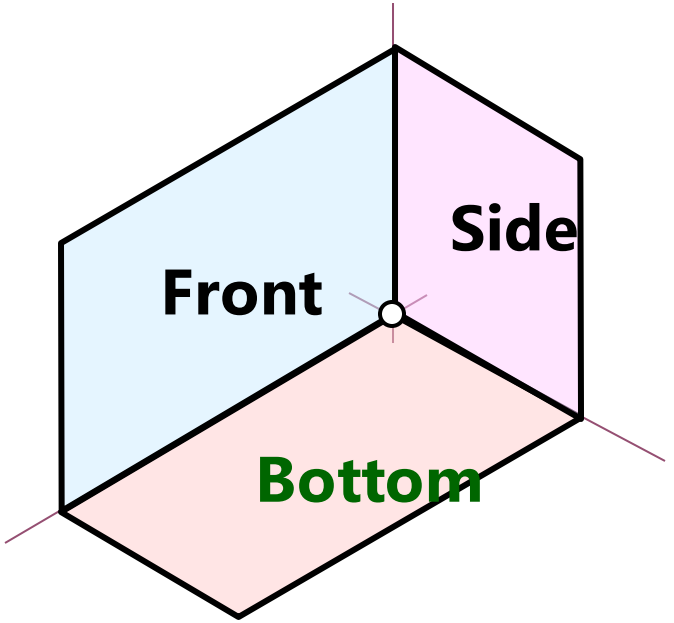
Example 1 : Object has only normal surfaces



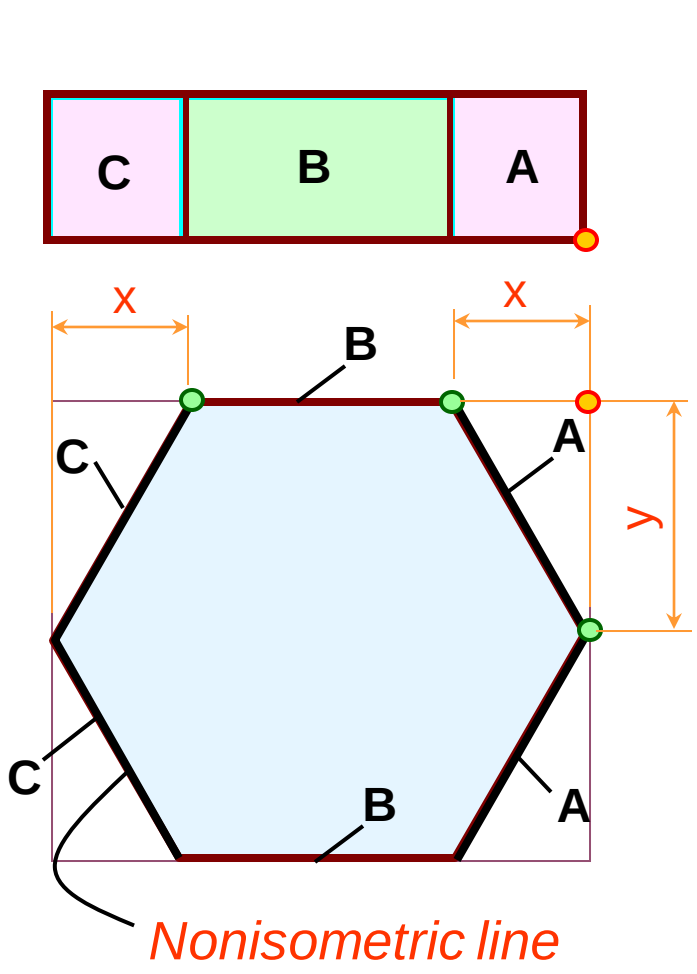
Regular

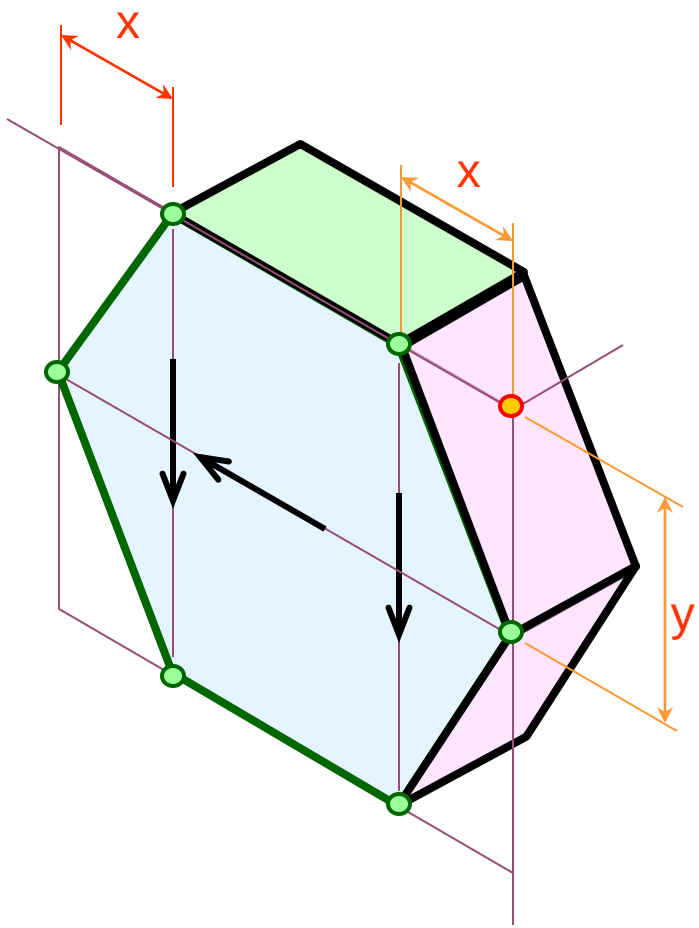


Reverse

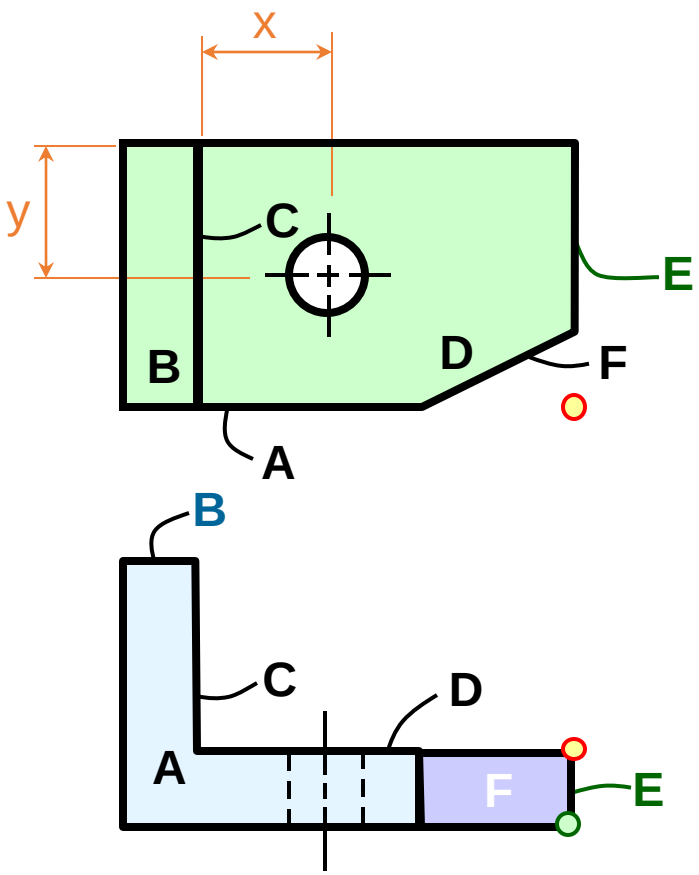


Example 3 : Object has inclined surfaces

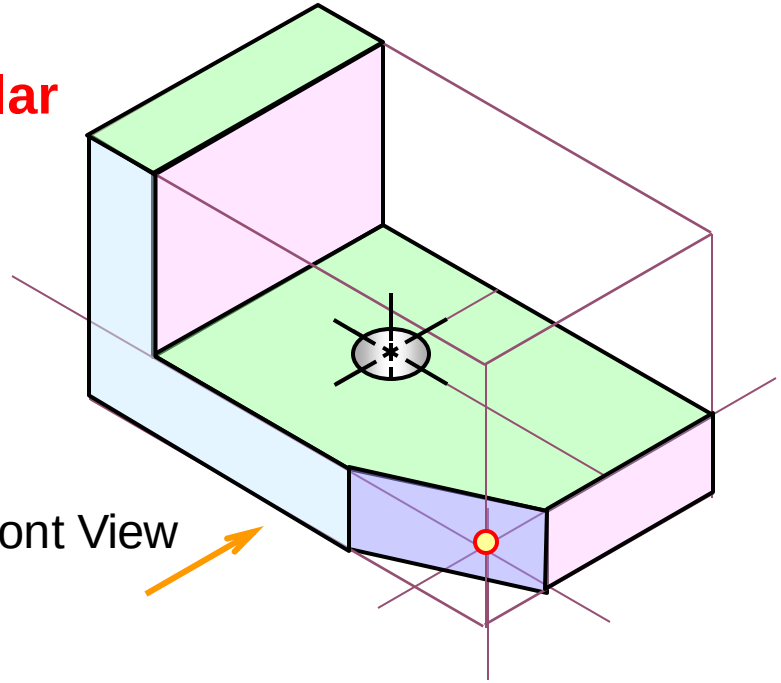




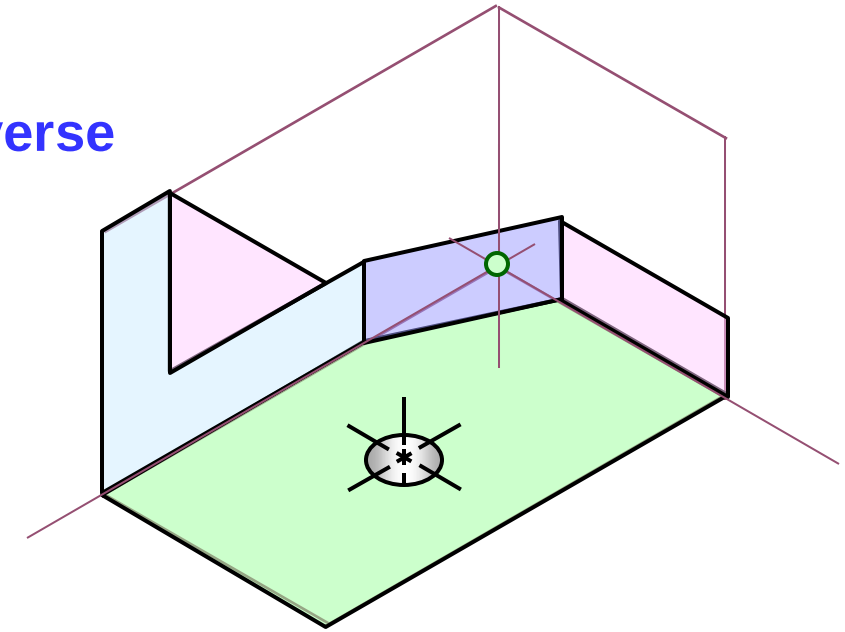
Example 4



Regular



Reverse



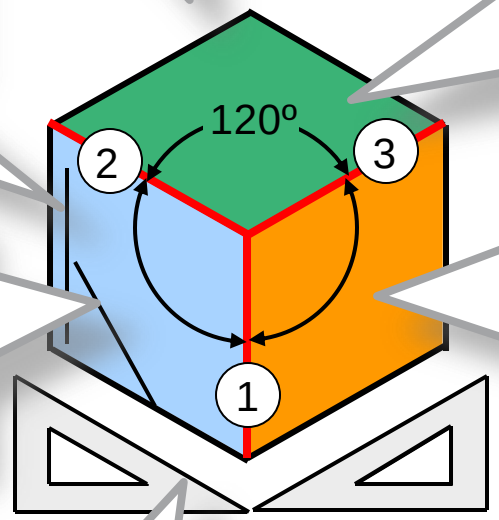
Isometric projections

Characteristics of isometric projections

All lines parallel to axes 1, 2 and 3 are isometric lines.

Axes 1, 2 and 3 form 120º angles between one another.

The projection is isometric (equal measures) because the height of axis 1, the length of axis 2 and the width of axis 3 are all proportionally reduced.

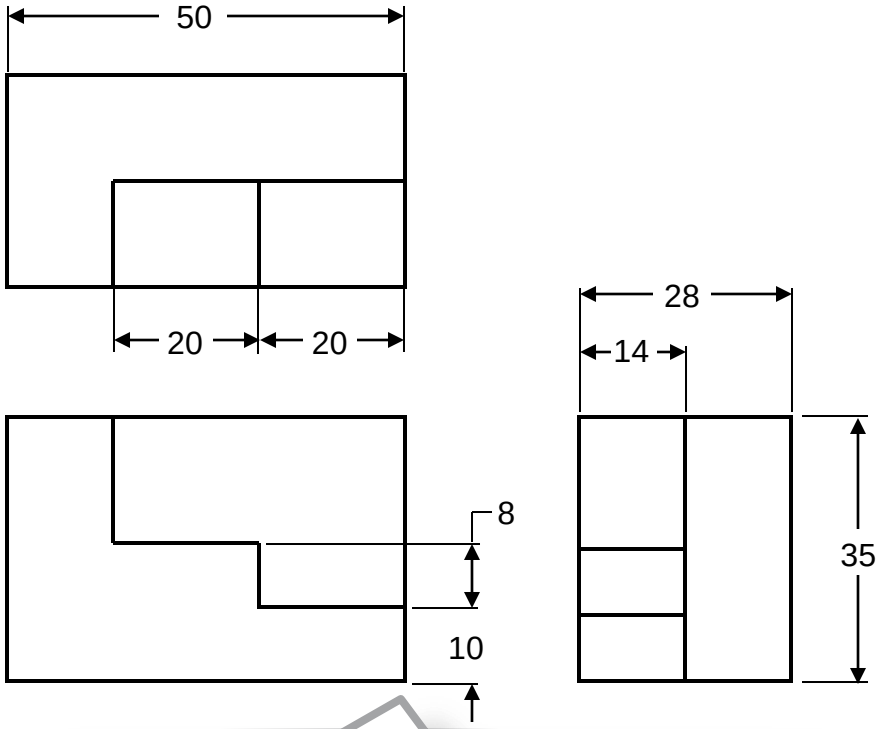


The lines not parallel to axes 1, 2 and 3 are non-isometric lines.

The sides of the cube and all planes parallel to them are isometric planes.

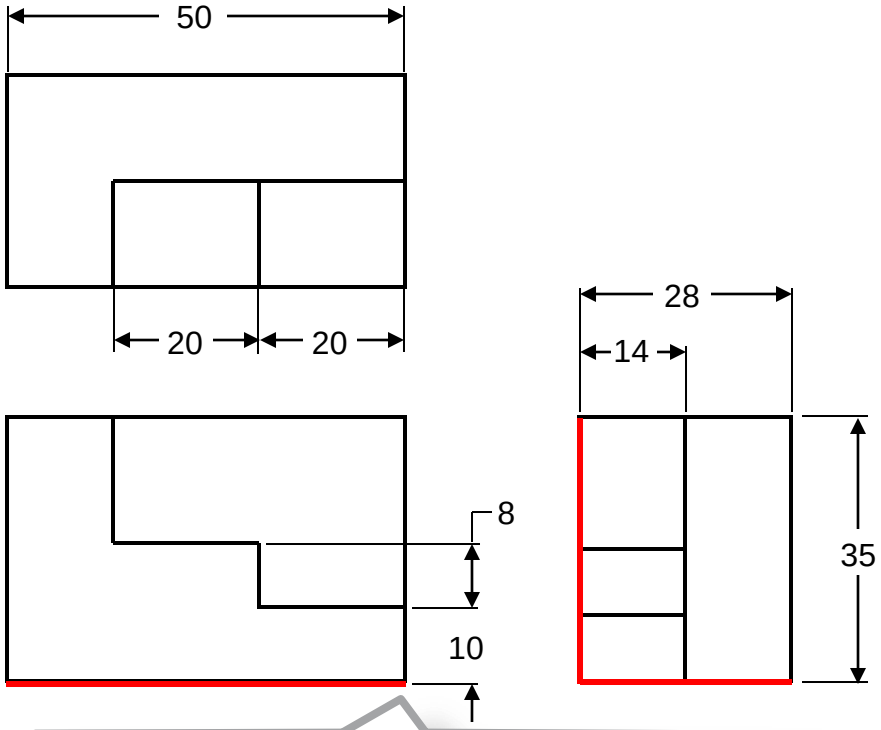
The isometric lines are angled at 30º.

Isometric drawing



We will illustrate the main stages of isometric drawing of the object shown above in multi-view.
We will use a method called box construction.

Isometric drawing



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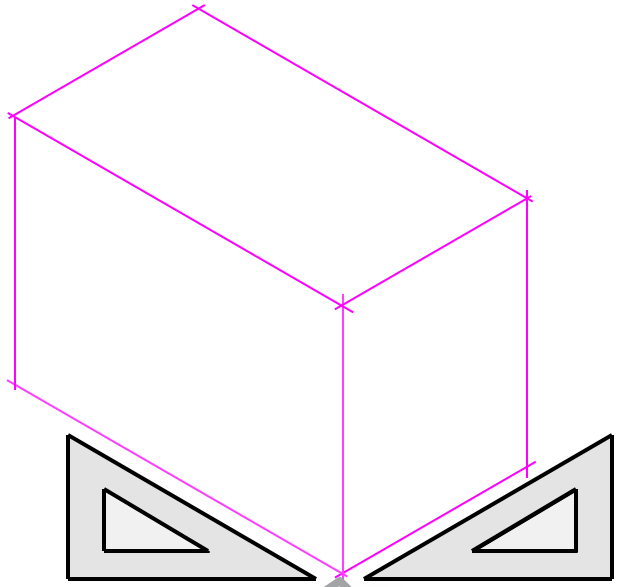
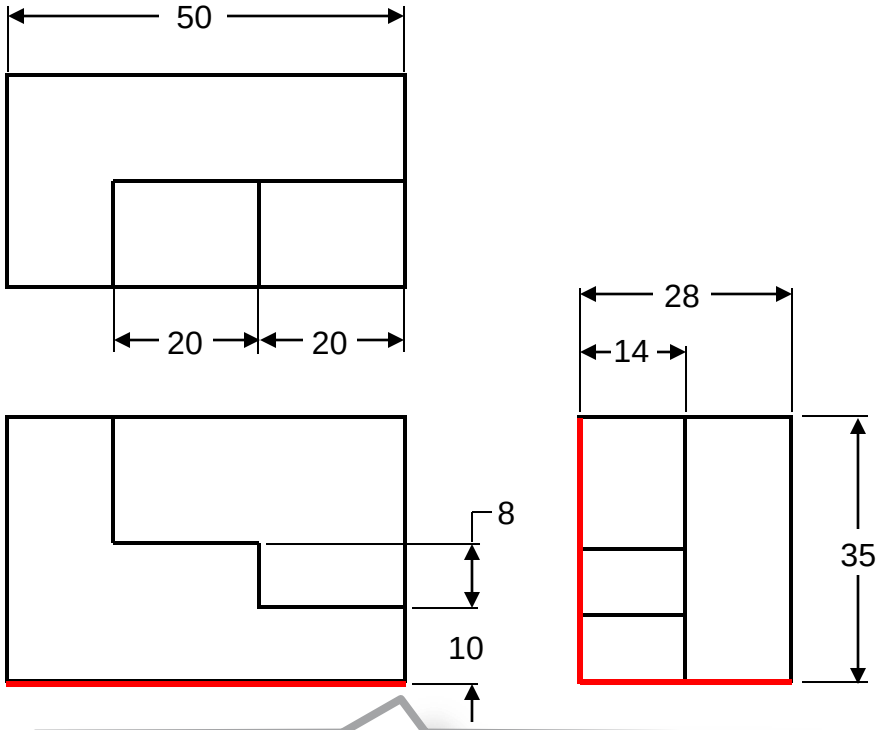


To create the box, use construction lines to outline an isometric box as large as the overall object to be drawn.

The vertical axis is equal to the real height.

The two other axes, drawn at 30° to horizontal, correspond to the actual width and length of the object.

Isometric drawing



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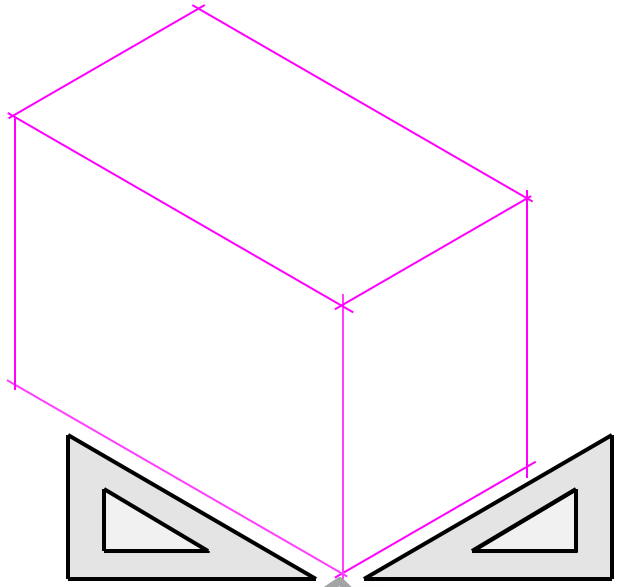

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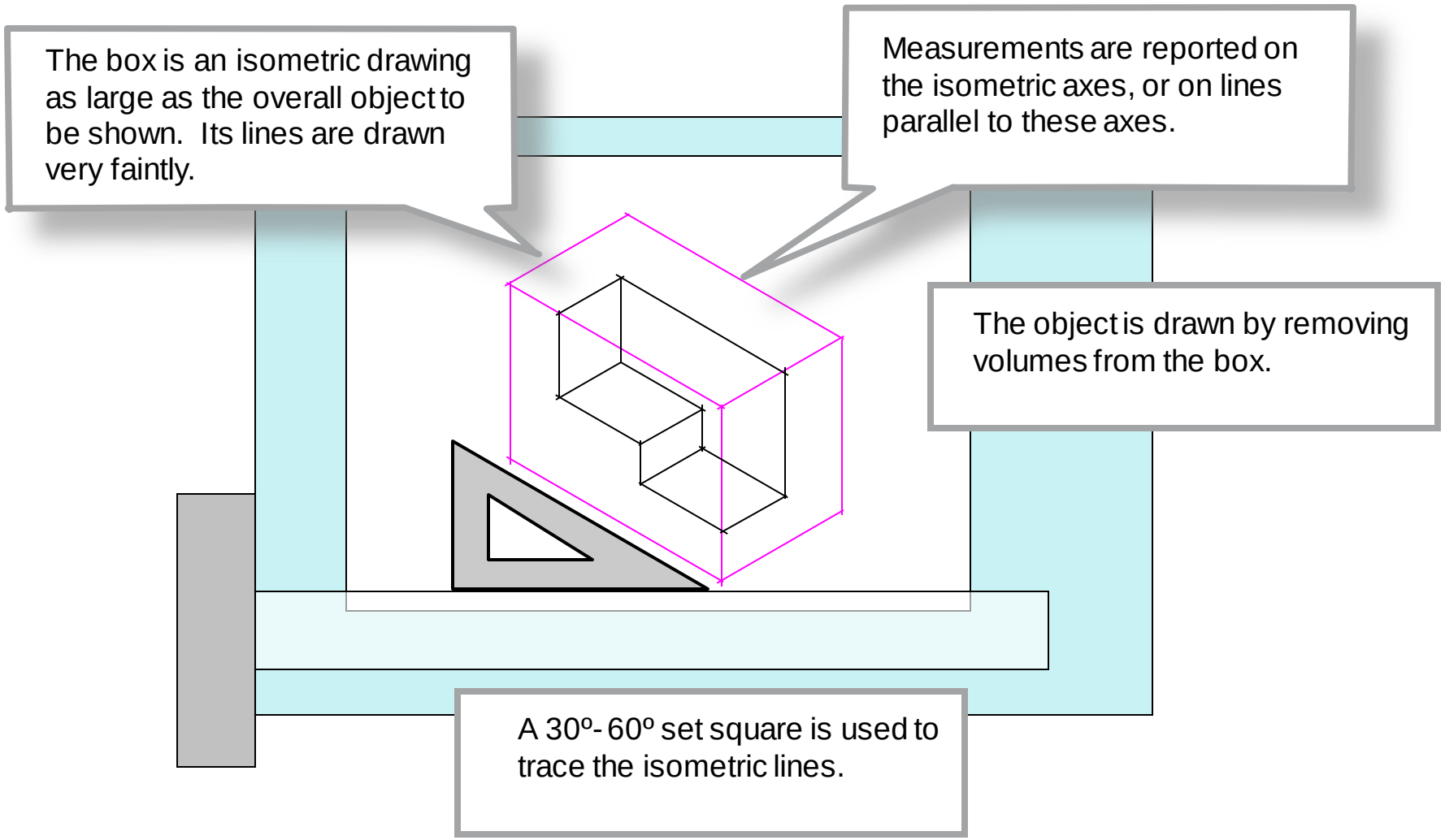
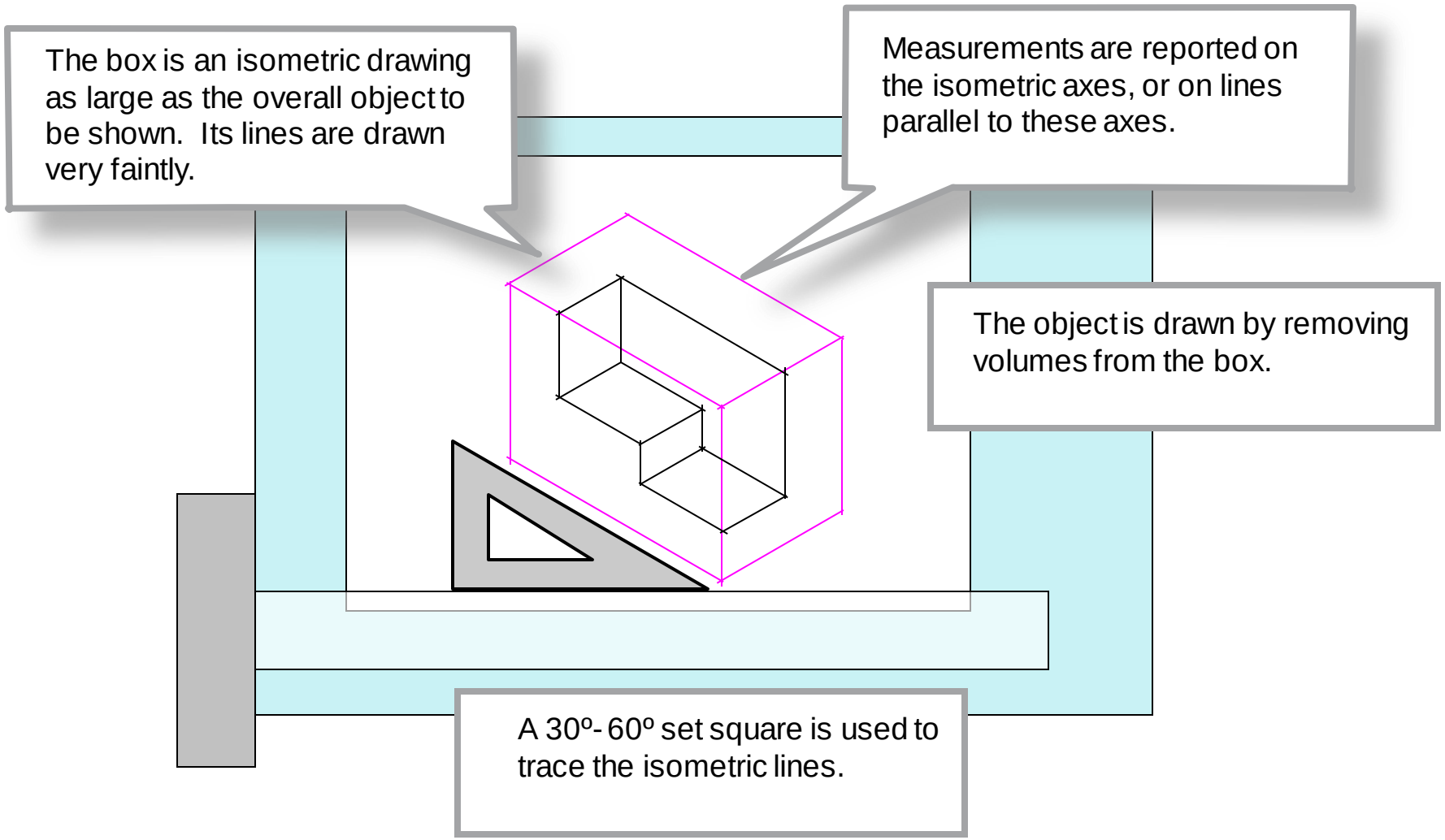


Isometric drawing



Isometric drawing

STAGES OF DRAWING IN ISOMETRIC PERSPECTIVE

STAGE 1

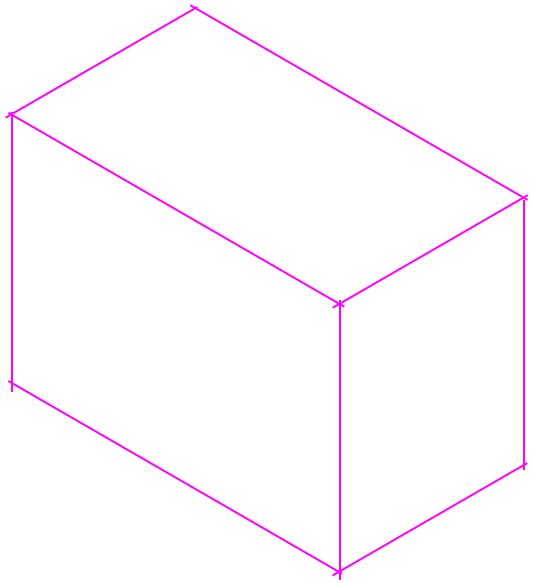
Sketch the box.

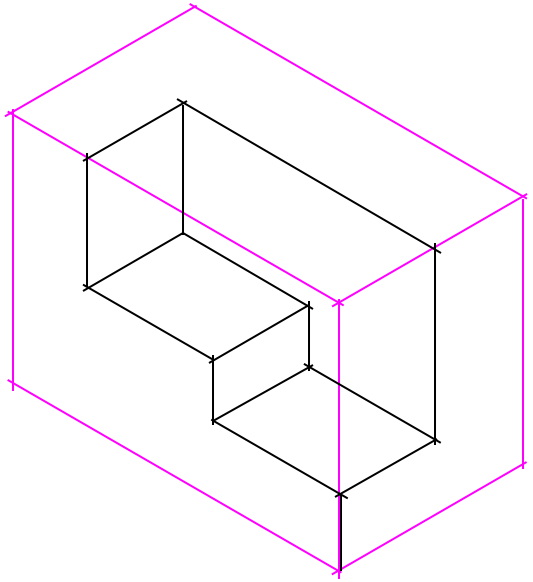
STAGE 2

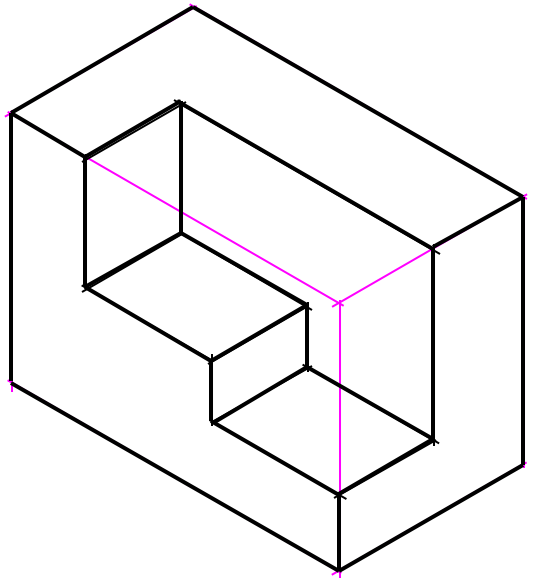
Measure on the axes and trace the details in construction lines.

STAGE 3

Carry out the final layout.

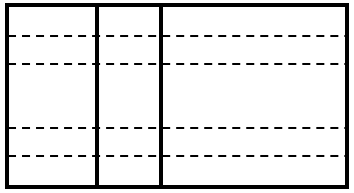




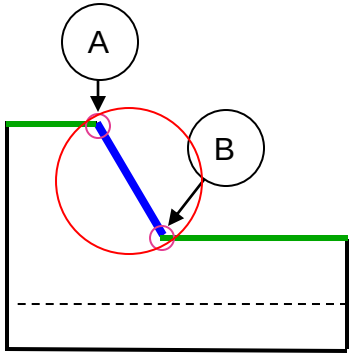


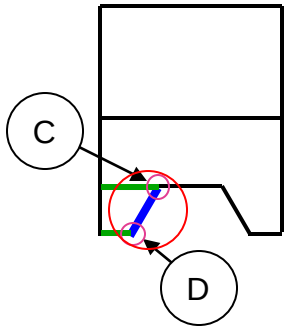
Isometric drawing

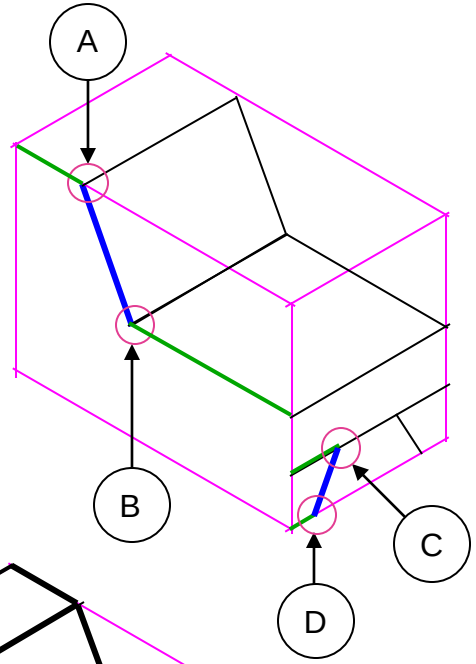
How to draw non-isometric lines and surfaces



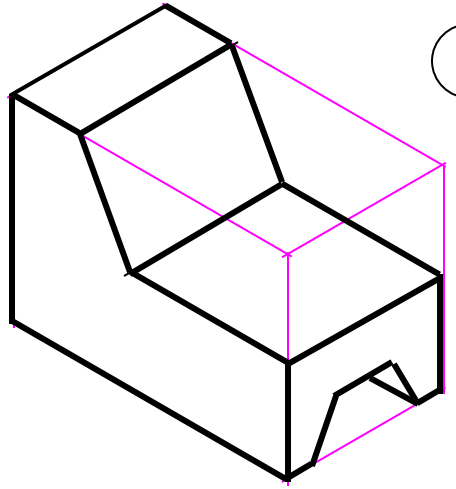
Non-isometric (oblique) lines and surfaces are not true to size in isometric perspective.







Dimensions of inclined lines and surfaces are determined by using their coordinates which must be located on isometric lines.



Essential Questions:

- **What is an isometric drawing?**

A pictorial drawing of an object positioned so that all three axes make equal angles(120 degrees) with each other.

- **How do you center an isometric drawing?**

Starting from the center of the workspace:
(1) draw a 30° line to the right half the length of the object
(2) draw a 30° line to the left half the width
(3) draw a line straight down half the height of the object.

Bibliography

GIESECKE, Frederick E., MITCHELL, Alva, SPENCER, Henry Cecil, HILL, Ivan Leroy, GYGDON, John Thomas et NGUYEN, Dinh N. « Dessin technique », Montréal, Éditions du Renouveau Pédagogique inc., 1982, 769 p

(Material developed by Project Lead the Way)

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