

Interpretation of Drawings

An Introduction to the Basic
Concepts of Creating Technical
Drawings

Introduction

- ◆ In the design process drawings are the main way in which information about an object or product is passed from one individual to another.
- ◆ Even if people do not speak the same language anyone who understands the “language of drawings” will be able to interpret the information on the drawings.
- ◆ For this reason many items have been standardized so that they have the same meaning no matter what language the user speaks.

Basic Concepts

- ◆ There are a number of basic concepts found in technical drawings. They are:
 - Line types (or the alphabet of lines)
 - Symbols
 - Dimensioning
 - Notes
 - Labels
 - Visualization

Line types

Object Lines:



Object lines are solid curved or straight lines that are used to outline all visible parts of the object. They are generally the darkest lines on the drawing. The only lines that are darker on the page than object lines are border lines. Border lines create a frame that defines the drawing area and houses the title block.

Hidden Lines:

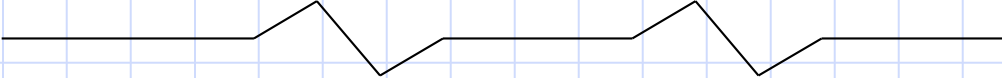


Hidden lines are made up of a series of evenly spaced dashes. They are generally the second darkest lines on the drawing and are used to show details about the drawing that are hidden from view.

Line Types *(Cont'd)*

Center Line: 

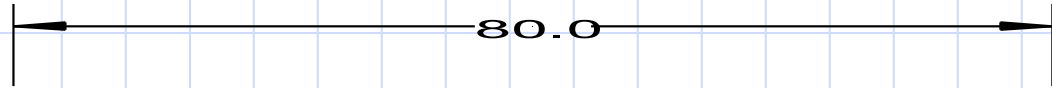
Made up of a series of long and short evenly spaced dashes. Used to indicate the center of objects, arcs, and circles.

Break Line: 

Break lines are used to show the beginning and ending of an object that has a pattern that repeats. Architects often use break lines when showing a set of stairs on a floor plan for a house or building.

Line Types *(Cont'd)*

Extension and Dimension Lines:



Extension lines extend from the part of the object being dimensioned and dimension lines are placed in between the extension lines. The measurement is centered either above the dimension line or in between it as in this example.

Section Lines:



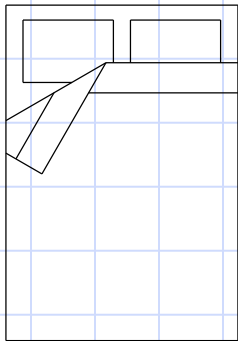
Section lines are used to show where a cross section view of an object has been taken. The dotted portion of the line shows where the "cut" was made and the arrows at each end indicate the direction that you look at the cross section.

Symbols

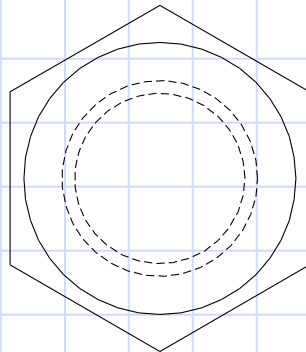
Symbols are used when:

- it is too time consuming to draw the actual object.
- it would place too much information on the drawing.

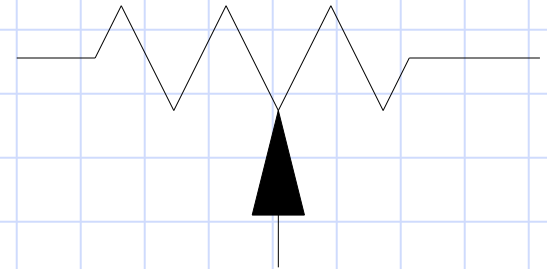
Symbols are available for all specialized areas of drafting. Many symbols will look like the original object but others will be stylized to represent the object



**Architectural Symbol
for double bed**

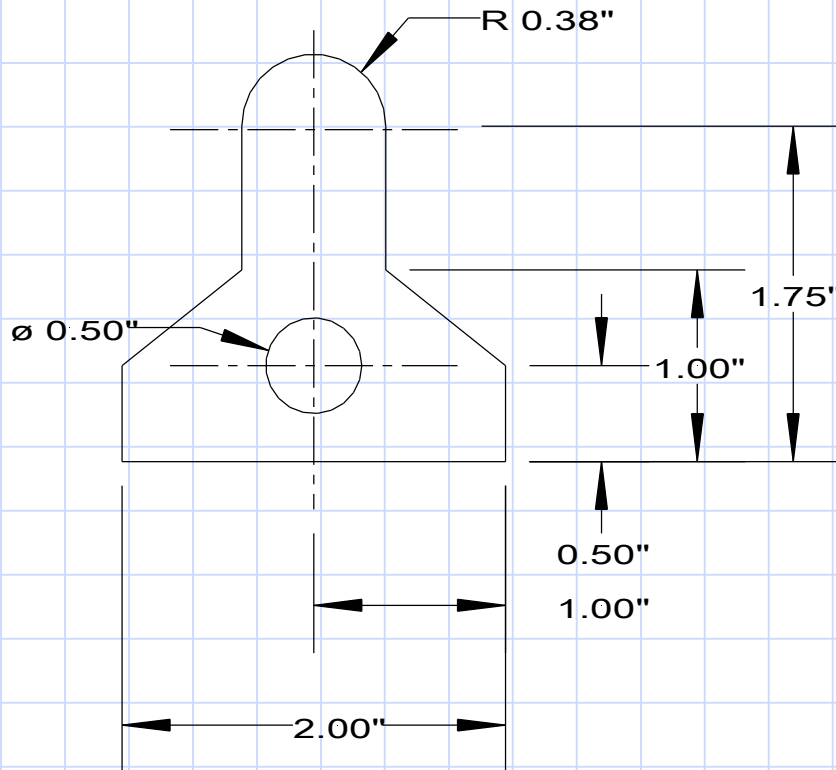


**Mechanical Symbol
for bolt**



**Electronic Symbol
for Variable Resistor**

Dimensioning



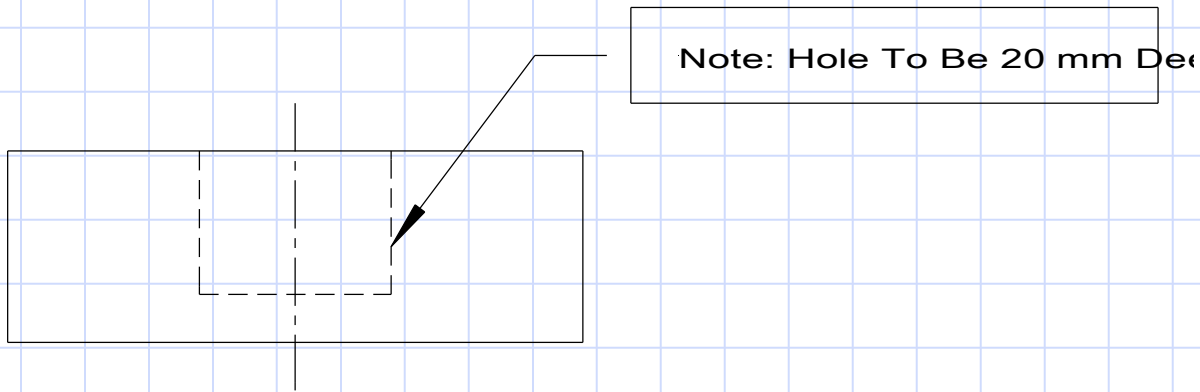
When Dimensioning:

- Extension lines do not touch the object
- Arrange measurements so that the smallest is nearest the drawing and the largest is furthest away.
- Generally all dimension have a set of extension lines.
- Extension lines can extend from object, hidden or center lines.
- Leader lines are used to show diameters or radii.

Notes

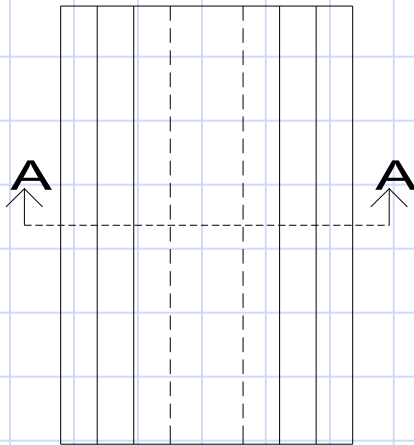
Notes are exactly what the name implies. They provide additional information concerning a particular part of a drawing. There are some rules that have to be followed when using notes. They are:

- Do not place notes on the drawing itself, place them to the side.
- There should always be a leader line pointing to the part in question.
- Do not use too many notes on one drawing.

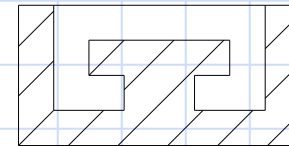


Labels

Labels are simple names attached to various drawings. They are used to identify views, sections, details, and drawing sheets in a series of drawings.



Top View



Cross Section "A-A"

Visualization

Visualization is the process of looking at a series of drawings that may include pictorial drawings, and detailed drawings. By looking at all drawings as part of the whole object you develop a mental image as to its overall size and shape.

Pictorial drawings are three dimensional drawings that look similar to a picture. There are two basic types. They are:

- Isometric
- Oblique

Detail drawings are also called Orthographic drawings. An orthographic drawing is a series of two dimensional drawings that show various views of the object. The views used most often are the front, top and side.

The remainder of this presentation will deal with pictorial and detail drawings.

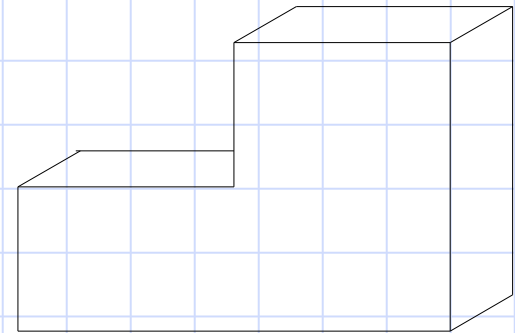
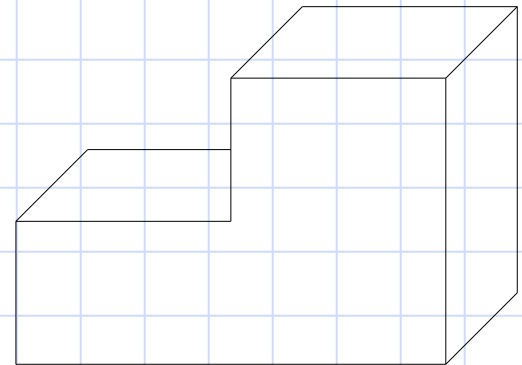
Pictorial Drawings

There are two main types of pictorial drawings. They are:

- Oblique
- Isometric

Oblique:

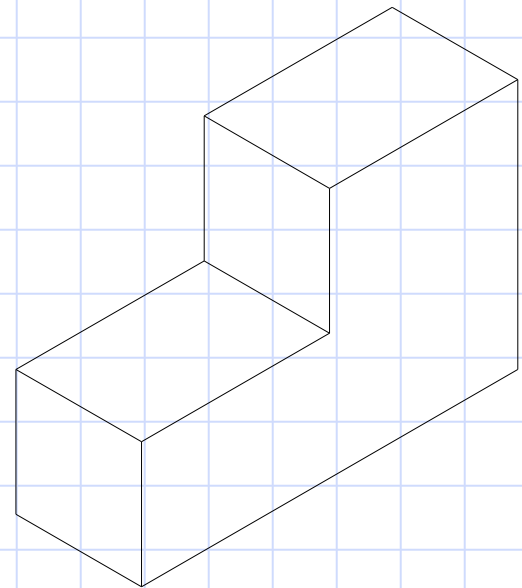
An oblique drawing is one where the front view of the object is in the same plane as the drawing surface and the sides and top are at an angle of either 30, or 45 degrees



Pictorial Drawings *(cont'd)*

Isometric:

An isometric drawing is one where the front and side are at 30 degrees to the vertical. This gives the impression that the object is tilted forward showing more of the top. The isometric drawing is most commonly used when constructing a working set of drawings.



Detail Drawings

Orthographic Projection:

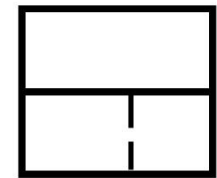
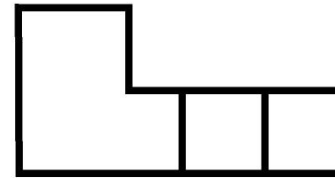
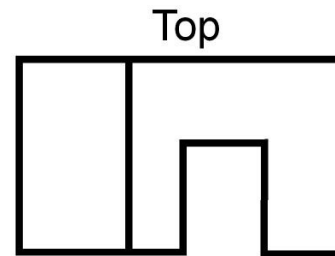
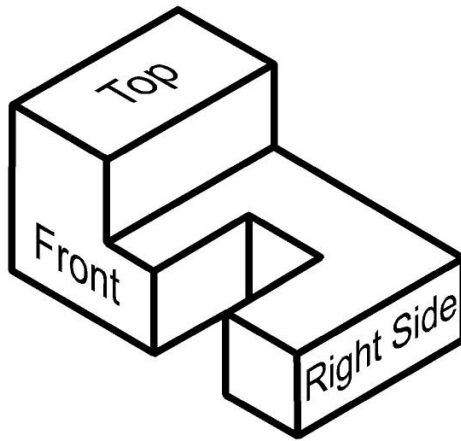
Another term for detail drawings is orthographic projection. Here the object is drawn as a series of drawings each two dimensional and showing one surface. By combining two or more of these surface drawings you build a visual image of what the three dimensional shape of the object is actually like.

Generally the front, top and side view will be enough to show the shape of the object. However you can use as many views as required. Keep in mind that the views must maintain their correct orientation.

These two dimensional views are used because they make it easy to add dimensions to the drawings. Take care and only use the number of dimensions necessary, do not duplicate dimensions.

With the orthographic projection you also find a half scale isometric drawing that completes the plan.

Orthographic Projections

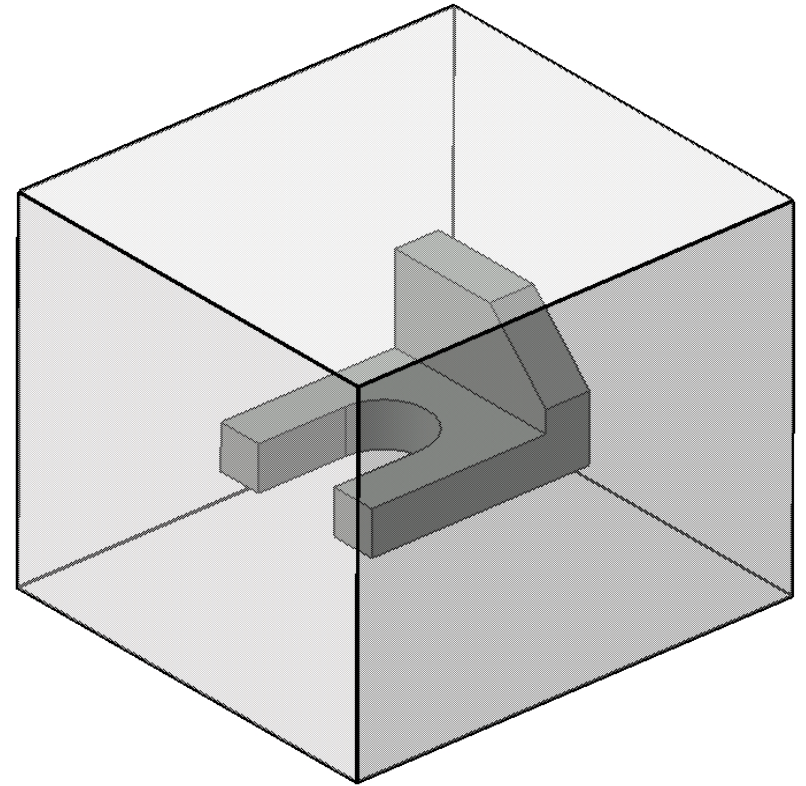


Front

Right Side

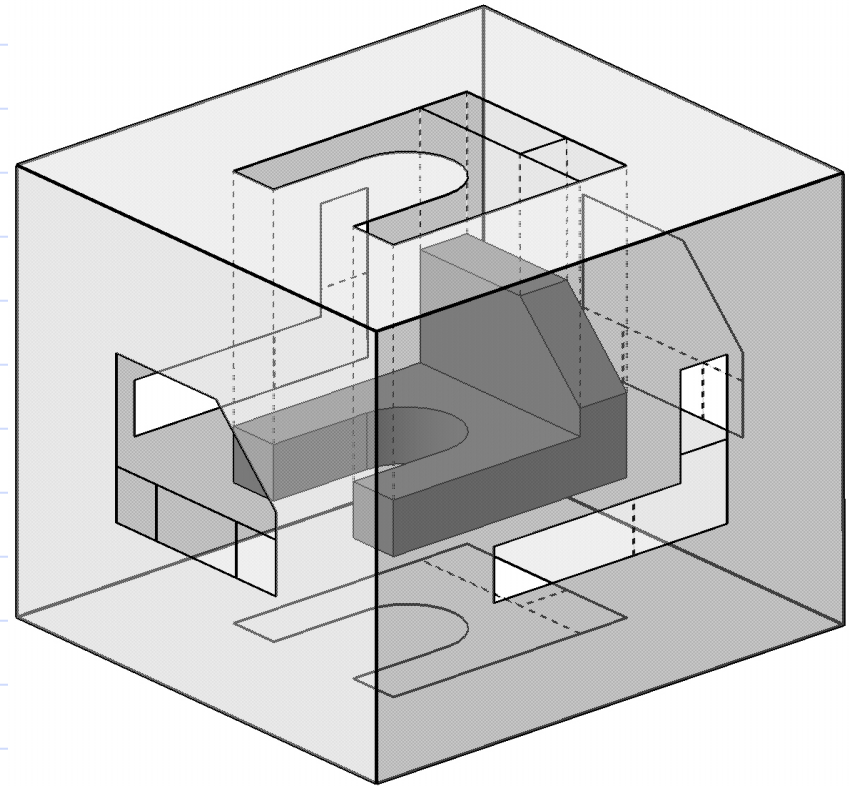
Orthographic Projections (Glass Cube Method)

- ◆ Imagine the object has been placed inside of a glass cube.
- ◆ The six sides of the cube represent the six views of the object in orthographic projections



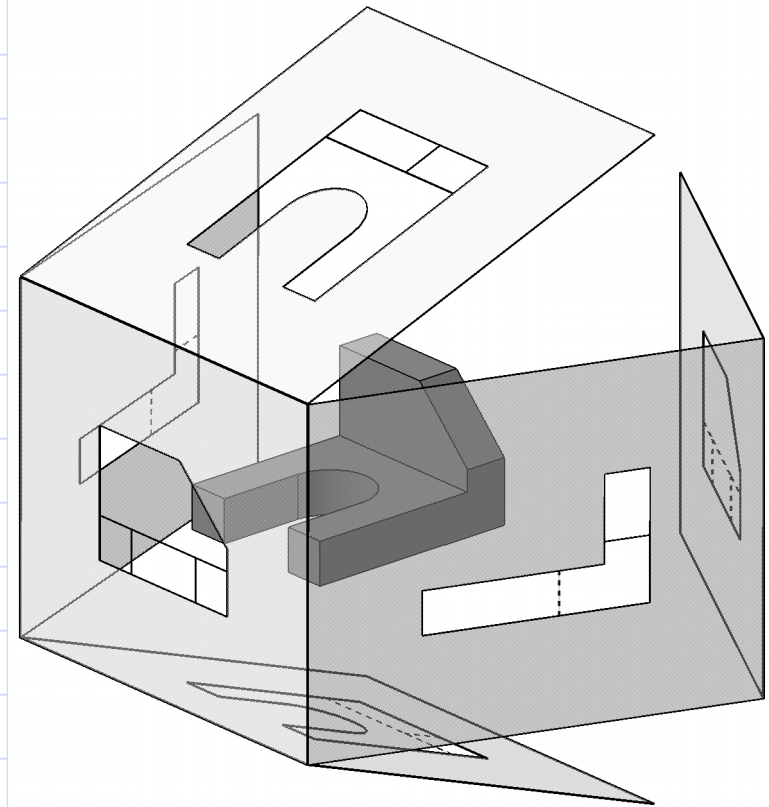
Orthographic Projections (Glass Cube Method)

- ◆ Here is the same image of the isometric object projected onto the six sides of our cube



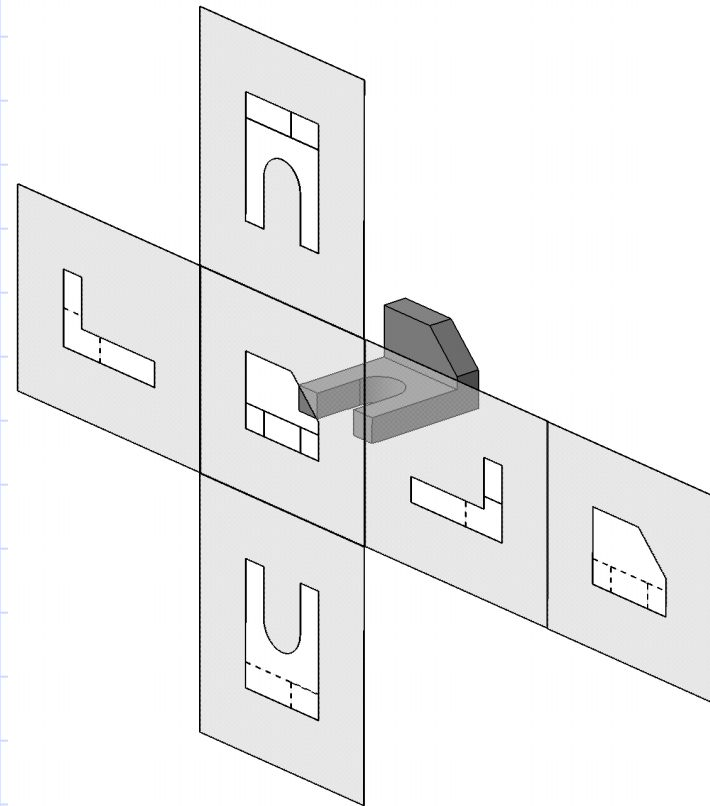
Orthographic Projections (Glass Cube Method)

- ◆ As we begin to unfold our glass cube or box the six principle views of the isometric can be seen as an orthographic projection



Orthographic Projections (Glass Cube Method)

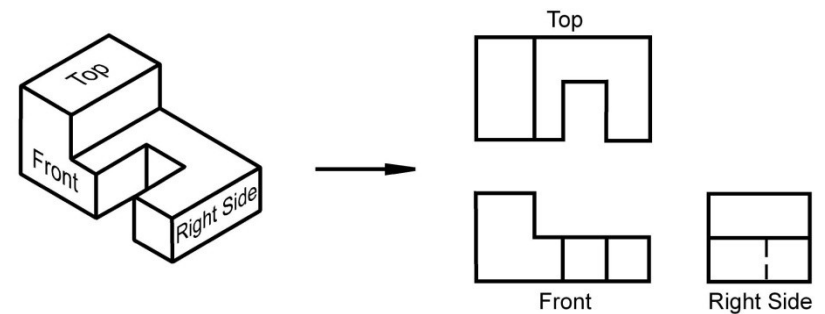
- ◆ As we begin to unfold our glass cube or box the six principle views of the isometric can be seen as an orthographic projection



Orthographic Projections

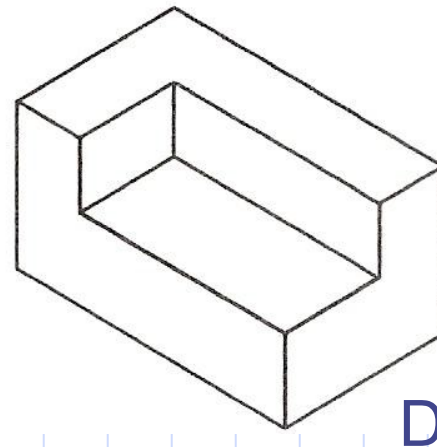
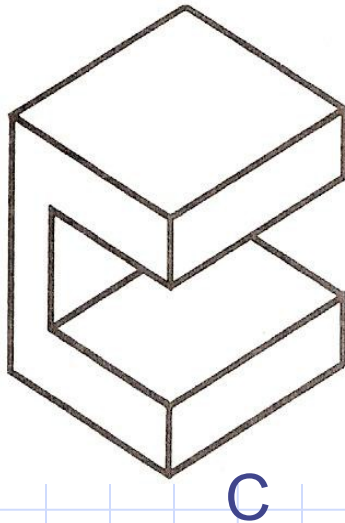
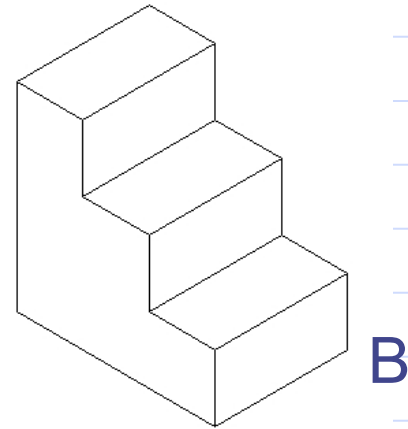
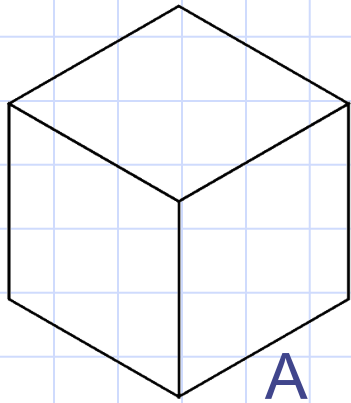
◆ For most objects that we draw orthographically we only require the three basic views, called **“Standard Views”**....

- Front View
- Right Side View
- Top View



Orthographic Projections

(Activity)



Interpretation of Drawings

An Introduction to the Basic
Concepts of Creating Technical
Drawings