
MECH 220
Engineering Graphics

Auxiliary Views

Fall 2017-18

Inst.: Abed Alkader Al Saidi

Office:

IOEC room 411

Extension:

3504

e-mail:

aa166@aub.edu.lb

MECH 220: 3rd LECTURE

Topics

- ◆ **Concept & Definition**
- ◆ **Glass Box Projection**
- ◆ **Learning how to plot primary auxiliary views**
- ◆ **Drawing Curved Shapes**
- ◆ **Learning how to plot secondary auxiliary views**
- ◆ **Sketching Exercise**

MECH 220: 3rd LECTURE

Auxiliary Views

Concept & Definition

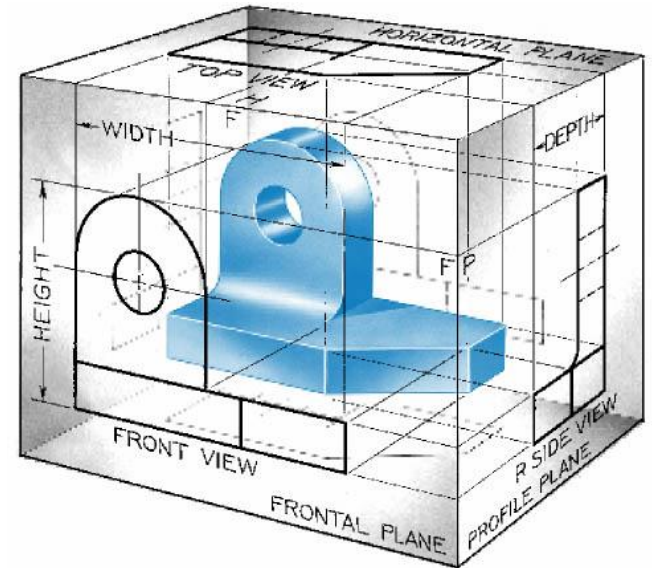
MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

Concept & Definition

Synonymous to
Auxiliary:

- Supplementary
- Supportive
- Helpful
- Assistant

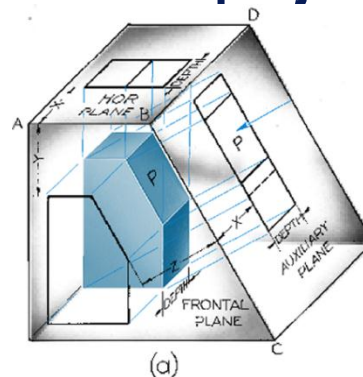


Therefore, *Auxiliary* Views can be defined as *Helper* Views that:
Reveal the true shape and size of those features located on angled surfaces without any distortions when viewed from planes parallel to those angled surfaces.

MECH 220: 3rd LECTURE

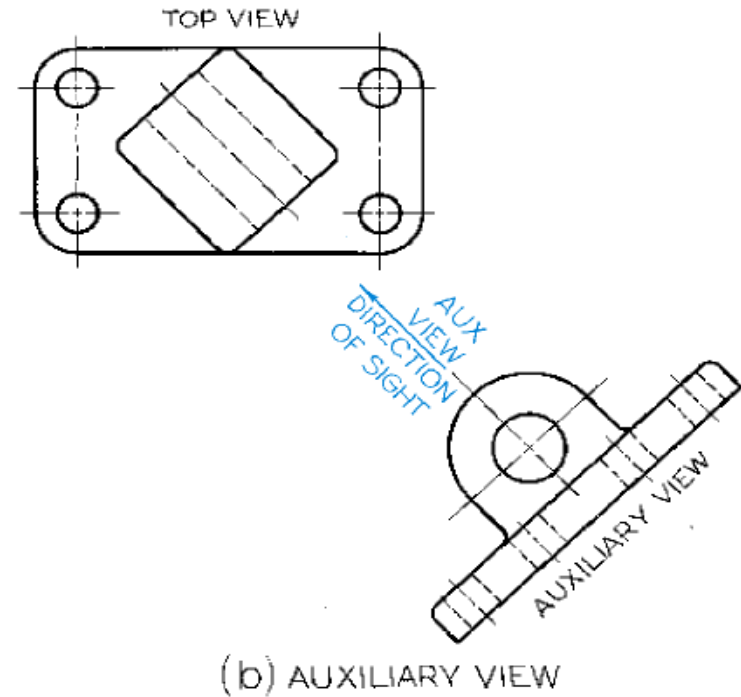
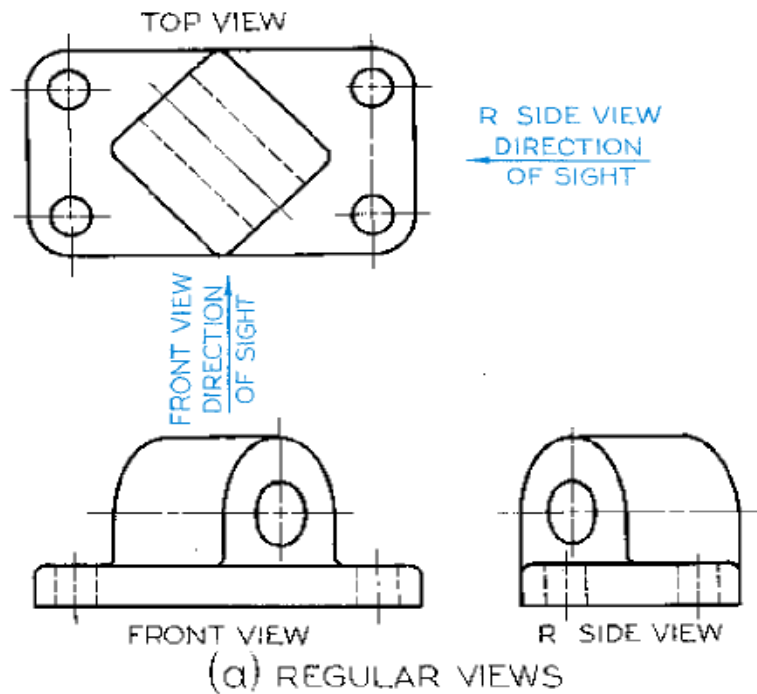
AUXILIARY VIEWS:

- ◆ Auxiliary views are often used to show inclined and oblique surfaces true size. Inclined and oblique surfaces do not show true size in the standard views.
- ◆ Auxiliary views are orthographic views taken from a direction of sight other than top, front, right side, left side, bottom, or rear.
- ◆ Primary auxiliary views are projected onto a plane that is perpendicular to only one of the principal planes of projection and is inclined to the other two.
- ◆ Secondary auxiliary views are projected from primary auxiliary views.



MECH 220: 3rd LECTURE

AUXILIARY VIEWS:



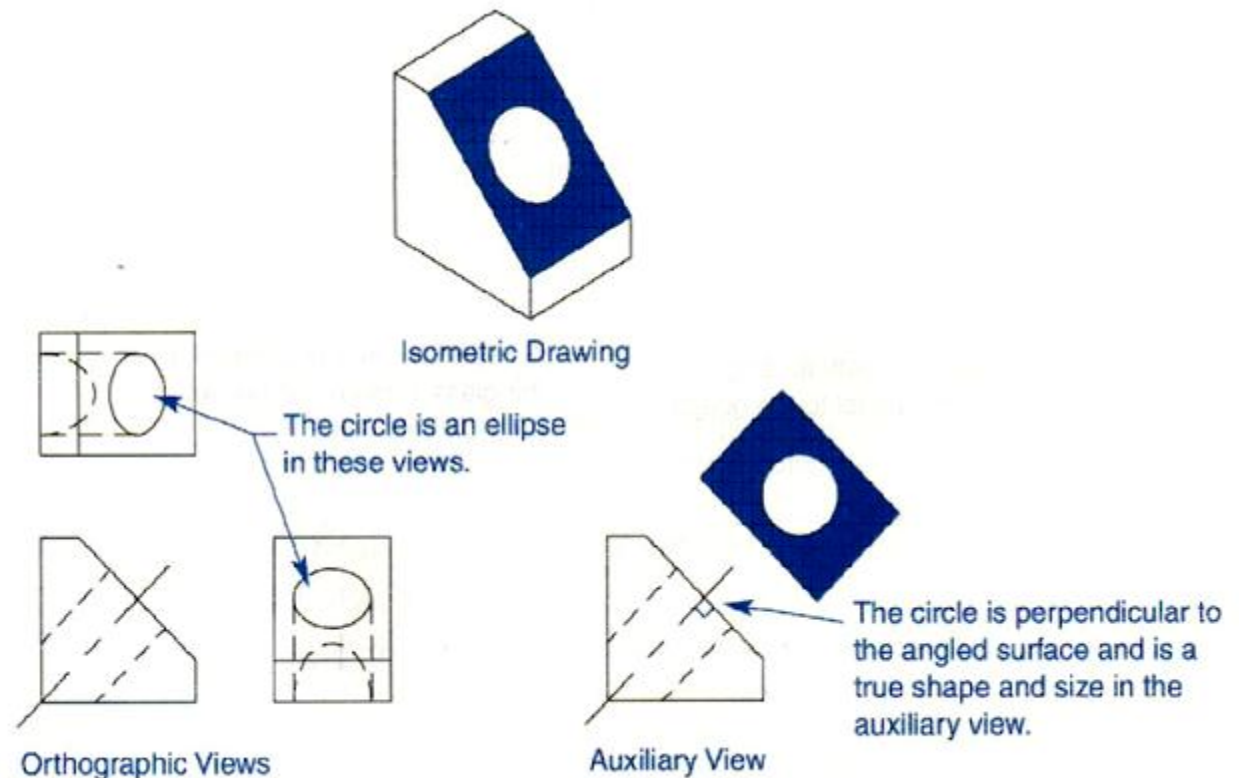
- ◆ Principal faces of the above object are not parallel to the standard planes of projection.
- ◆ The auxiliary view shows the true size and shape of the hole feature.

MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

Principles

- ◆ When orthographic views are not adequate to fully describe a part, auxiliary views are used to complete the job
- ◆ Extra auxiliary view helps to show the hole as a circle.



MECH 220: 3rd LECTURE

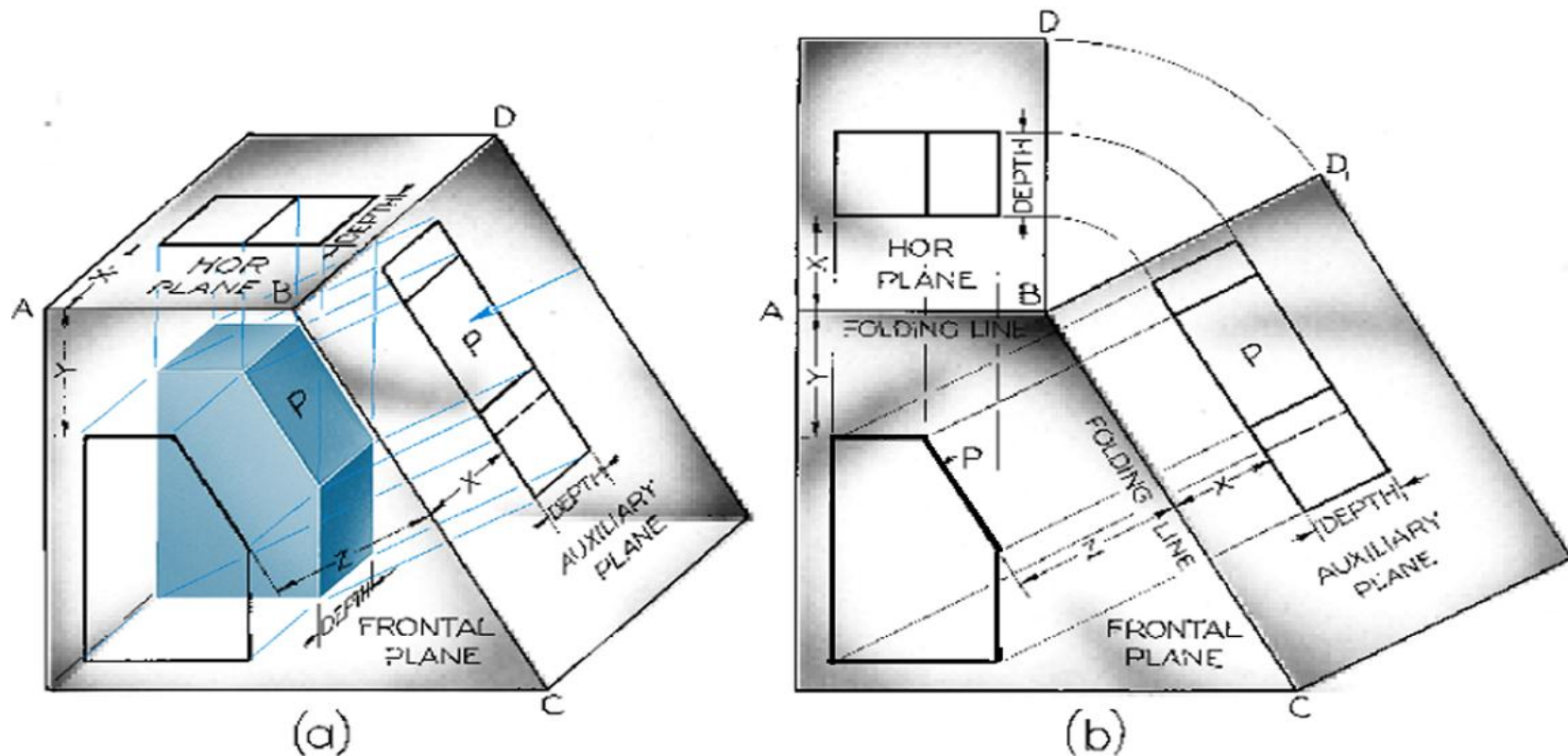
Auxiliary Views

Glass Box Projection

MECH 220: 3rd LECTURE

The Glass Box

With an Auxiliary Plane



- ◆ Imagine that the glass of box has angled shape like the object.
- ◆ Auxiliary view is outlined on the glass surface just like an orthographic view.
- ◆ The auxiliary view is rotate 90° to position it flat with the other views.

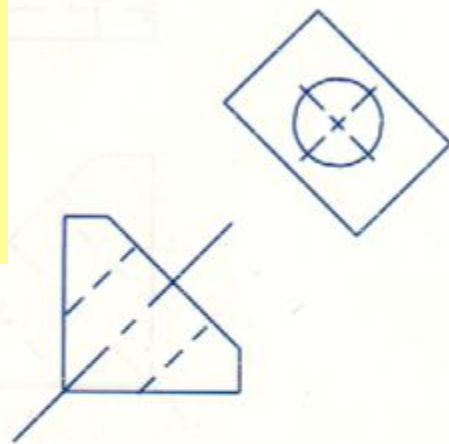
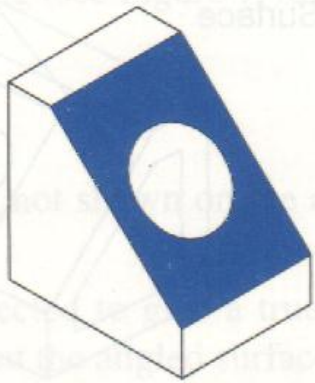
MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

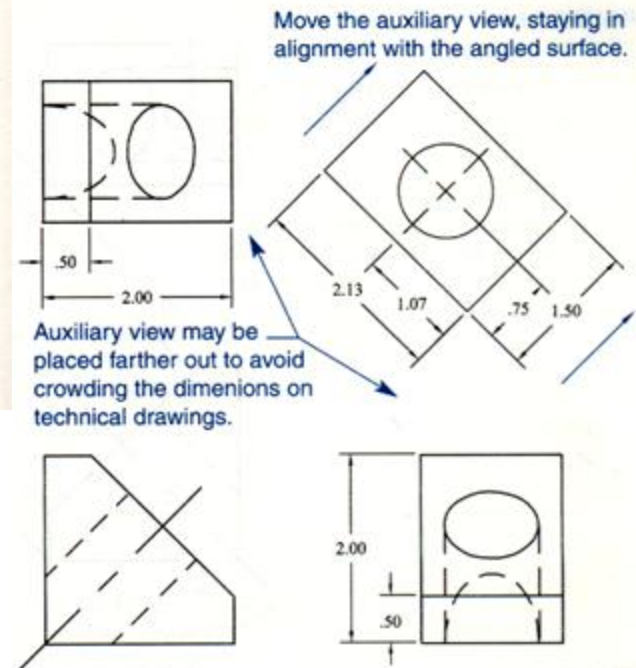
Projecting (and placing) primary auxiliary views

Drafting Tip #1:

Do not clutter your drawing by placing the AUX view too close to ORTHO views



Draw the auxiliary view parallel to the angled line.



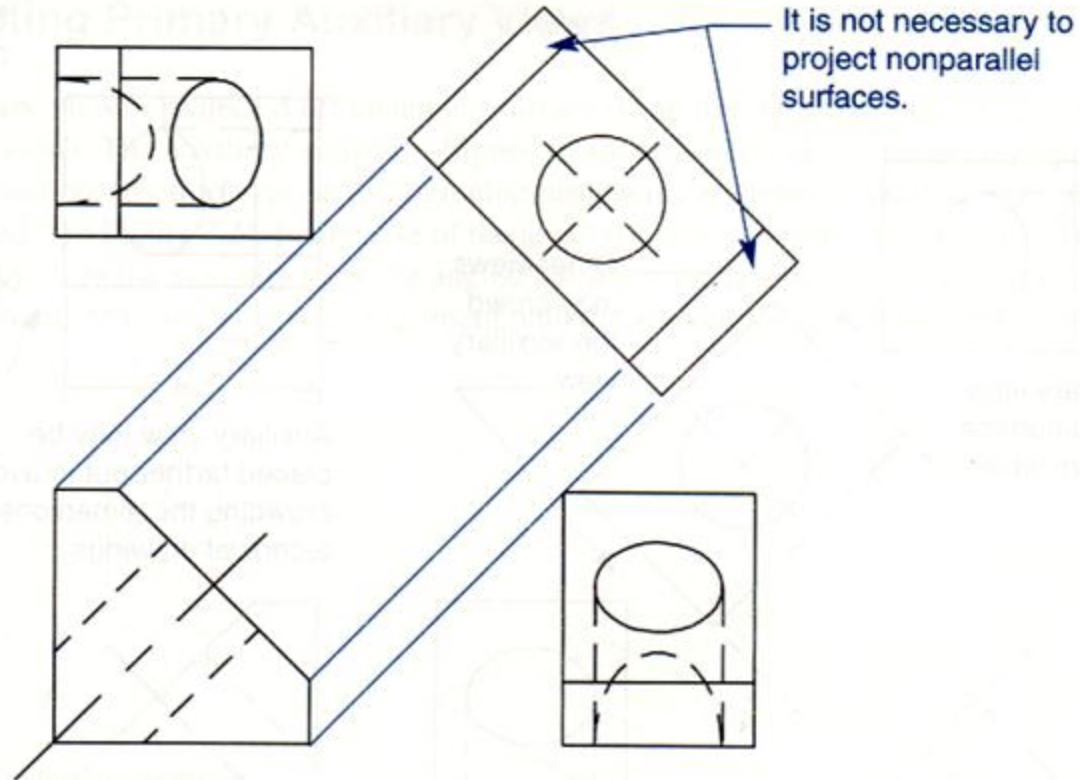
MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

Projecting (and placing) primary auxiliary views (cont'd)

Drafting Tip #2:

Do not bother to project non-parallel surfaces (edges)



- ◆ Hidden lines are not necessary shown on auxiliary views
- ◆ Professionals eliminate everything else but the angled surface.

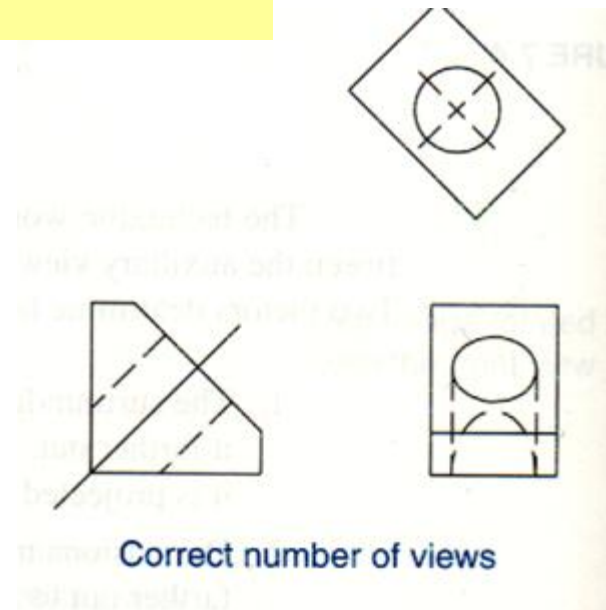
MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

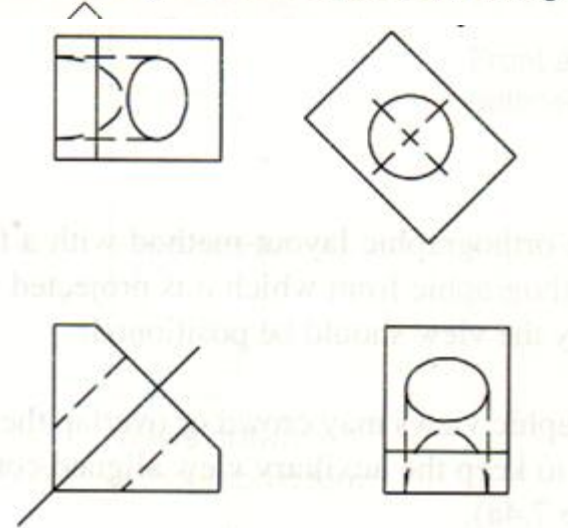
Projecting (and placing) primary auxiliary views (cont'd)

Drafting Tip #3:

Do not clutter
your drawing by
having
redundant views



The top and right-side views repeat information.
An auxiliary view can replace an orthographic.



- ◆ Eliminate views that repeats information available in other views

MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

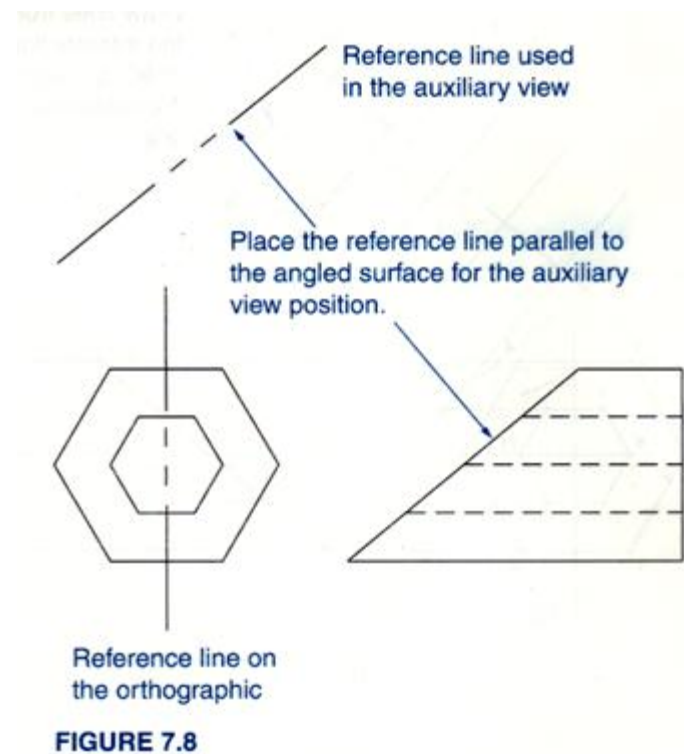
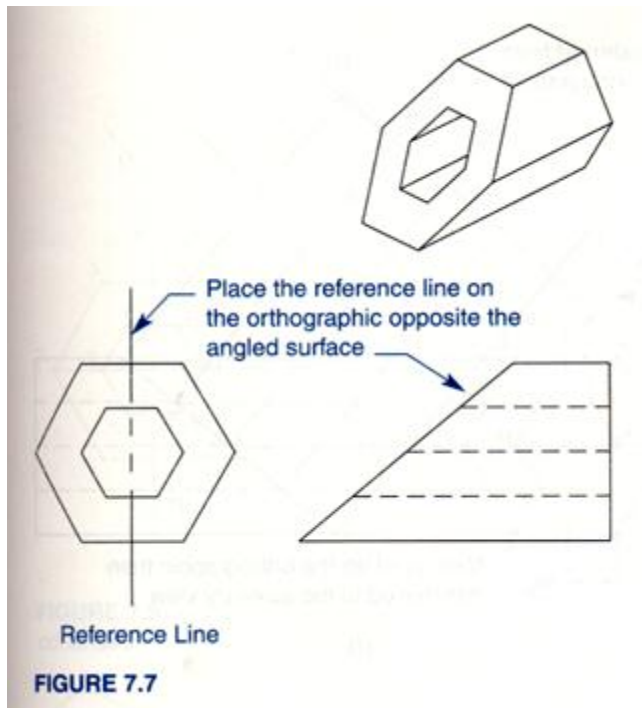
How to?

**Learning how to plot
primary auxiliary views**

MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

How to?



- ◆ Generating auxiliary views is simplified using reference line.
- ◆ Reference line is used as guide for transferring dimensions from the orthographic view to the auxiliary view.

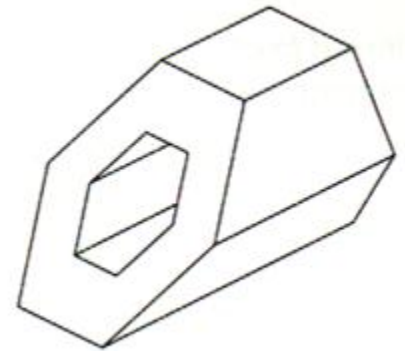
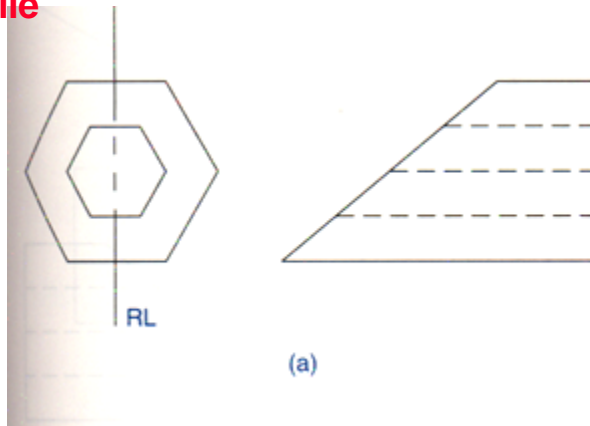
MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

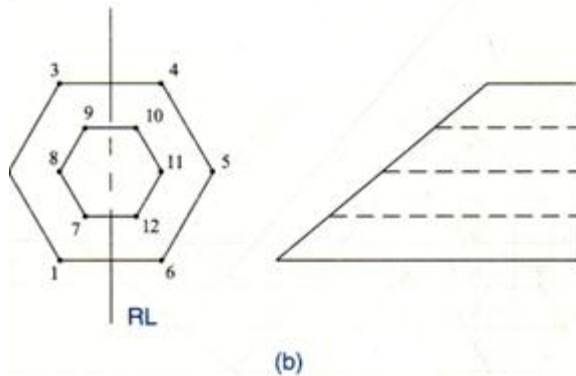
How to?

Step 1: Draw Ortho Views

Step 2: Place Reference Line on Ortho View opposite the view w/ angle profile



Step 3: Divide the Ortho showing original shape into equal parts (& Label)

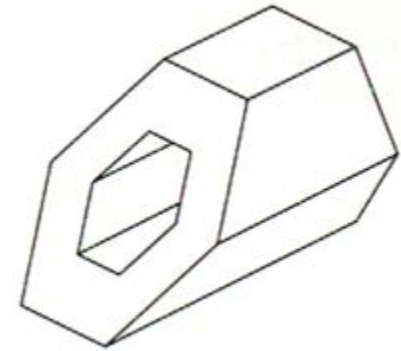
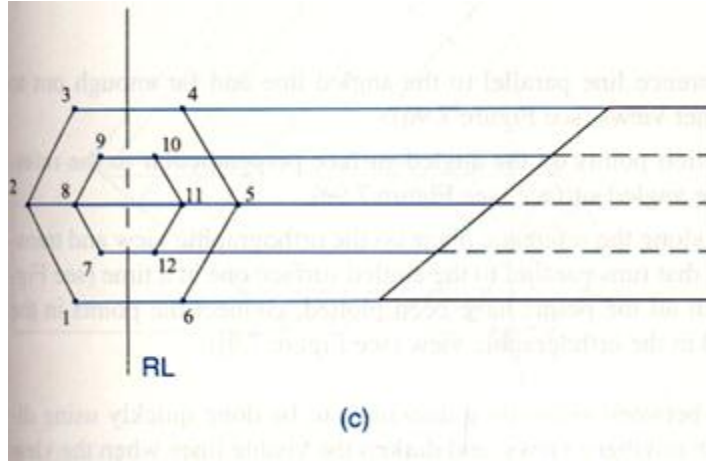


MECH 220: 3rd LECTURE

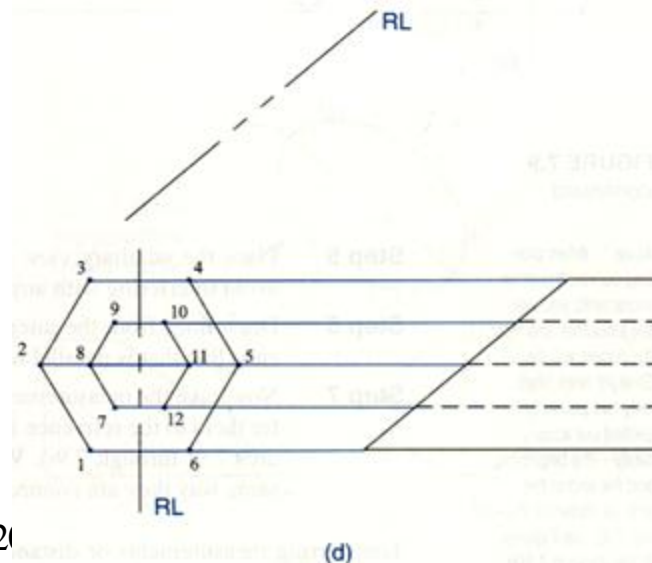
AUXILIARY VIEWS:

How to?

Step 4: Draw lines perpendicular to RL (long enough to intersect the angled surface opposite)



Step 5: Place the AUX view RL parallel to angled line (far out enough to avoid clutter)

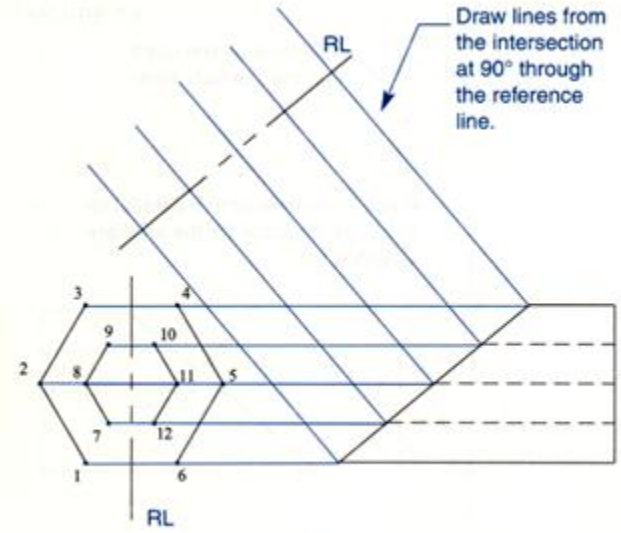


MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

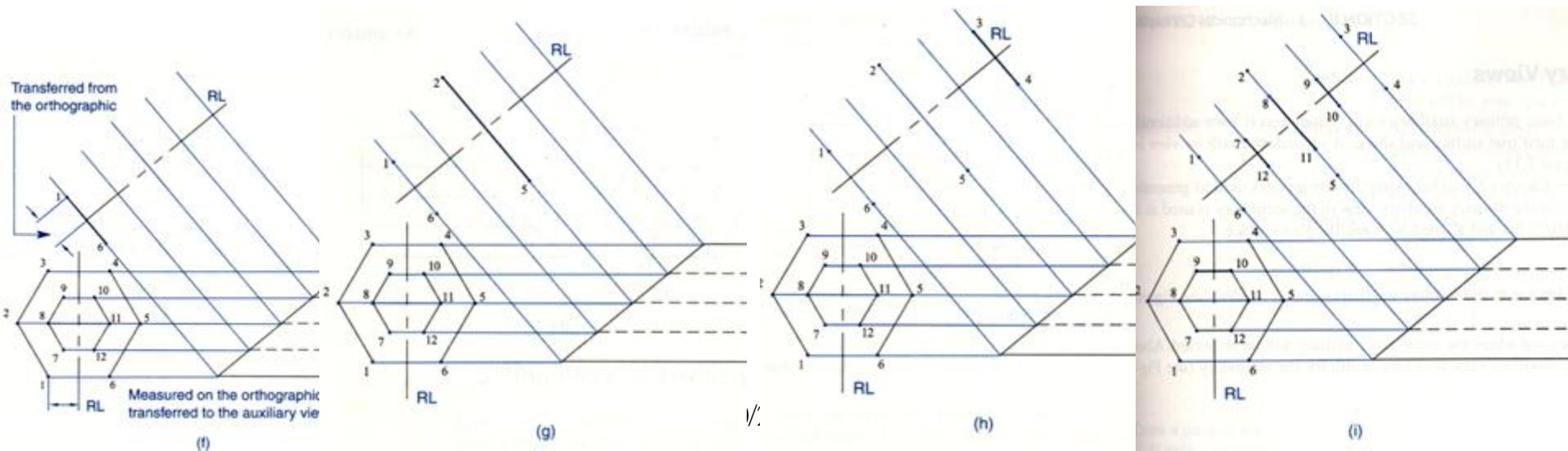
How to?

Step 6: Draw lines from the intersection points on the angled surface perpendicular to the RL that is parallel to the angled surface



(e)

Step 7: Take the measurements along the RL on the ORTHO view and transfer them to the RL that runs parallel to the angled surface (one at a time). Connect the points in the same order in the ORTHO view.



(f)

(g)

1/1

(h)

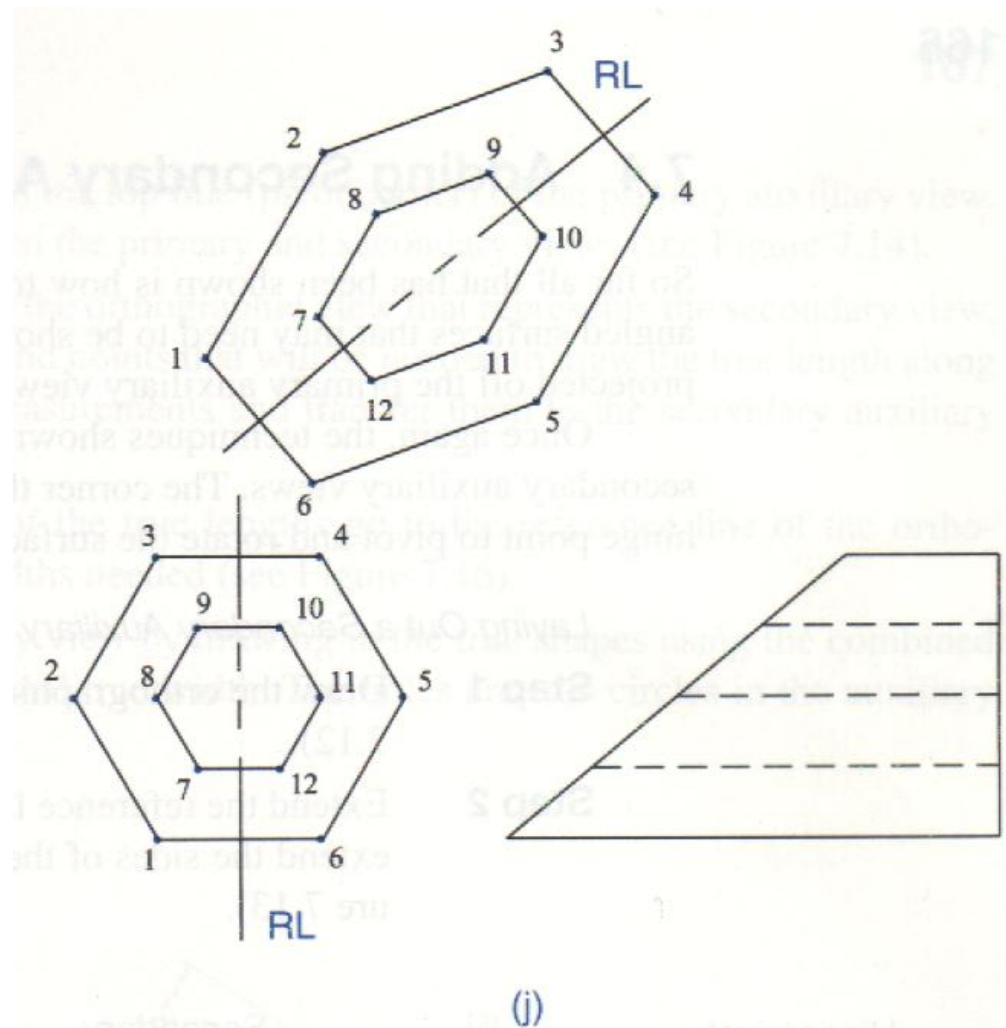
(i)

MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

How to?

The Resulting Auxiliary View



MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

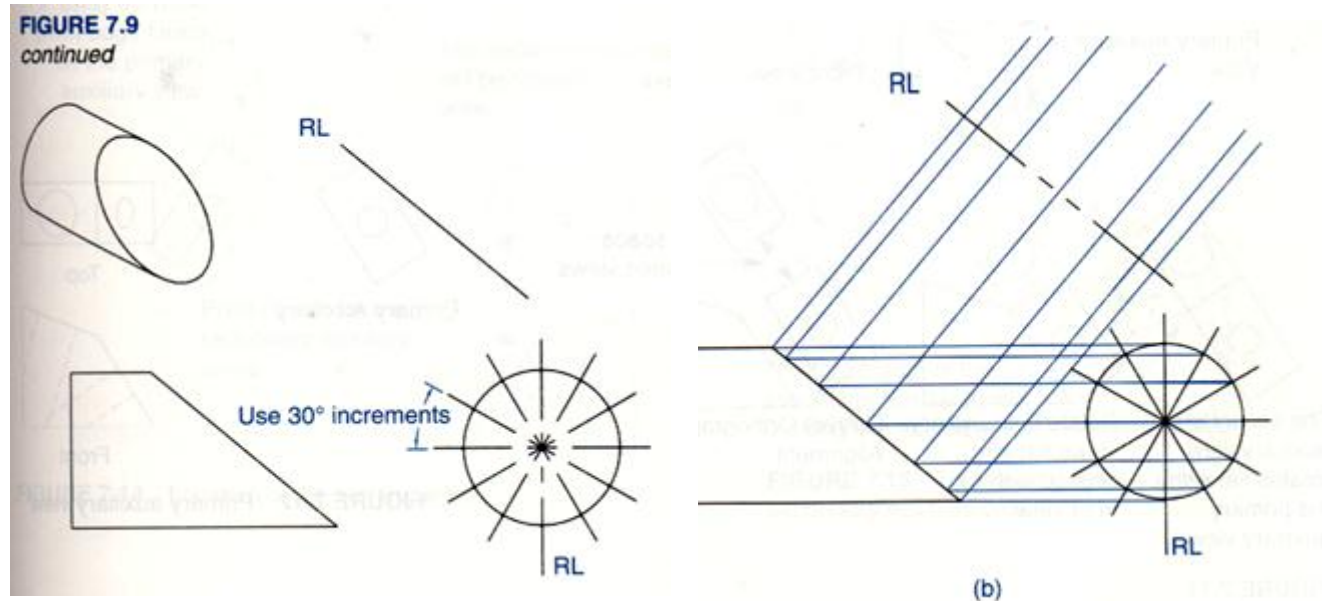
How to?

Drawing Curved Shapes

MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

How to? Curved lines

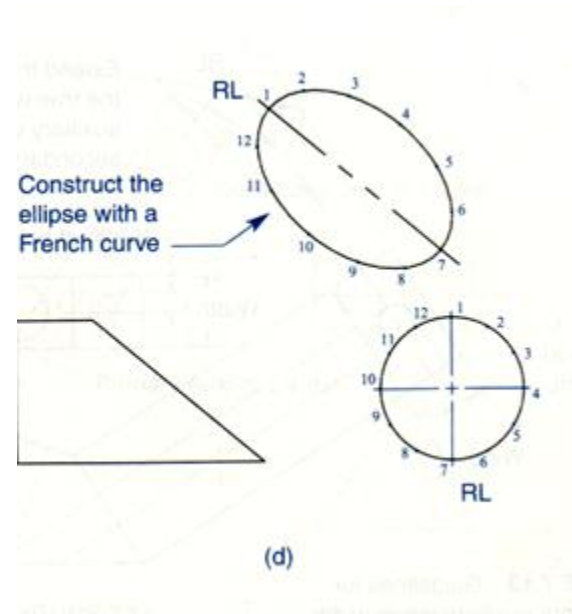
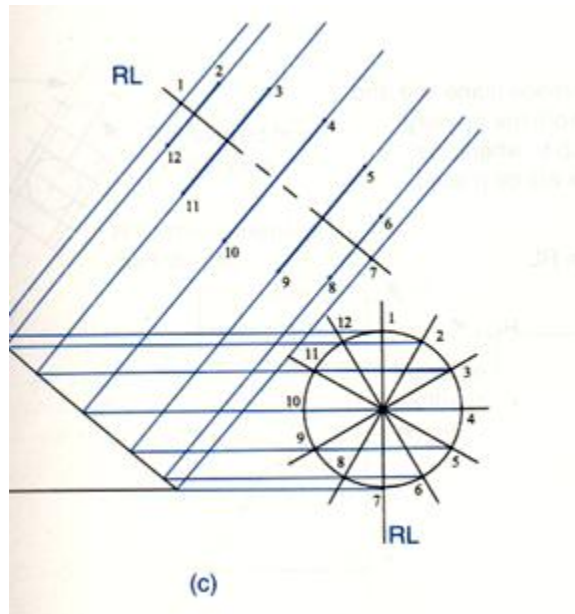


- ◆ Step 1: Draw orthographic views required
- ◆ Step 2: Identify the reference line (RL)
- ◆ Step 3: Divide the orthographic view showing the true shape into equal parts.
- ◆ Step 4: Draw lines perpendicular to the reference line and passing through the reference points. Intersect the lines with the angles surface

MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

How to? Curved lines



- ◆ Step 5: Draw the auxiliary view reference line parallel to the angled line and far enough to avoid interfering with other views.
- ◆ Step 6: Draw lines from the intersection points on the angled surface perpendicular to the reference line that is parallel to the angled surface.
- ◆ Step 7: Using the scale technique transfer dimension from the orthographic views to the auxiliary views.

MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

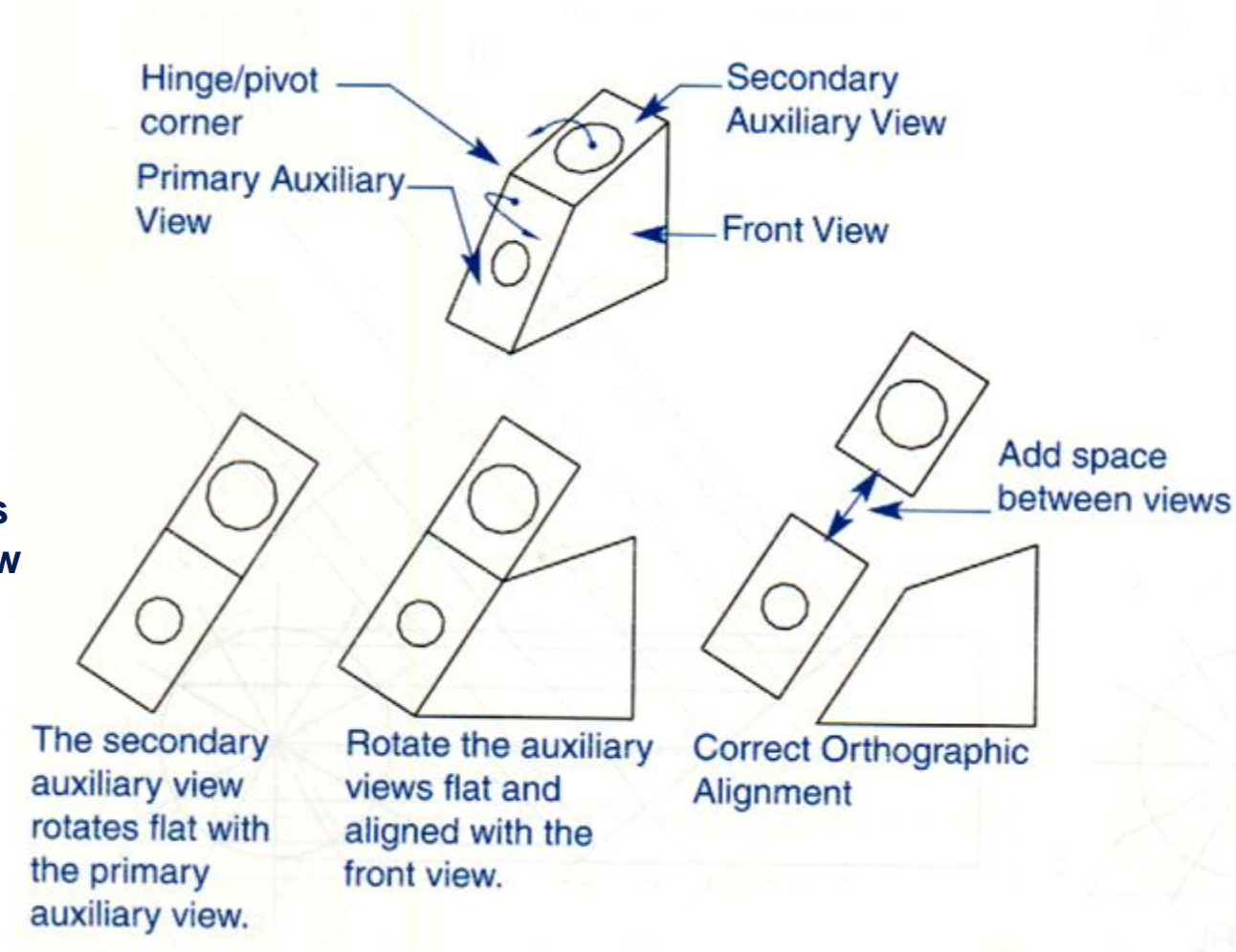
**Learning how to plot
secondary auxiliary views**

MECH 220: 3rd LECTURE

SECONDARY AUXILIARY VIEWS:

How to?

- ◆ Some objects have additional angled surfaces
- ◆ A secondary auxiliary view is projected off the primary auxiliary
- ◆ The corner that connects the primary auxiliary view to the secondary is used as hinge edge.



MECH 220: 3rd LECTURE

SECONDARY AUXILIARY VIEWS:

How to?

Step 1: Draw Ortho Views + Primary AUX View

Step 2: Extend out the Reference line (RL) and extend out the sides of primary AUX view, set the width of your secondary auxiliary view

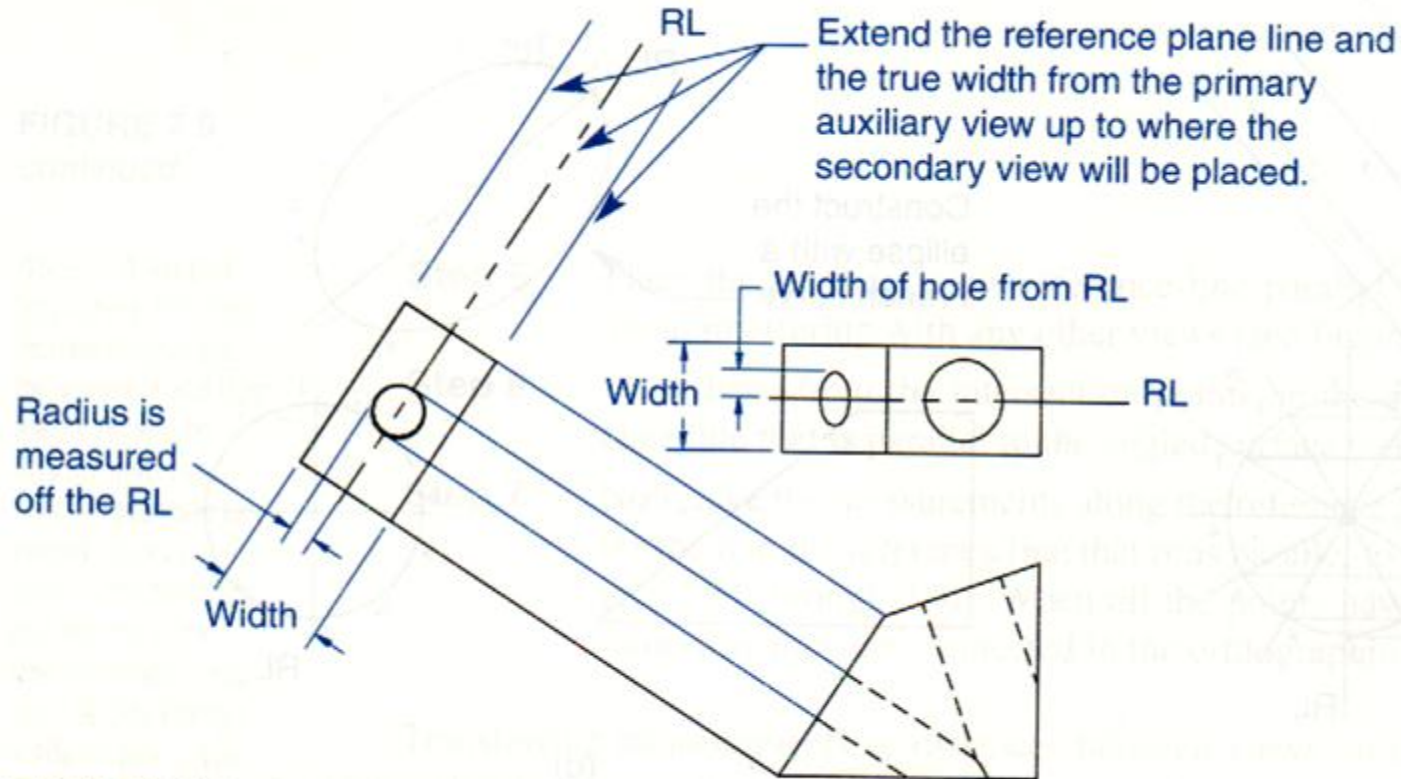


FIGURE 7.13 Guidelines for secondary auxiliary views width

MECH 220: 3rd LECTURE

SECONDARY AUXILIARY VIEWS:

How to?

Step 3: Draw parallel line 1" from the top pivot line (to form space between views)

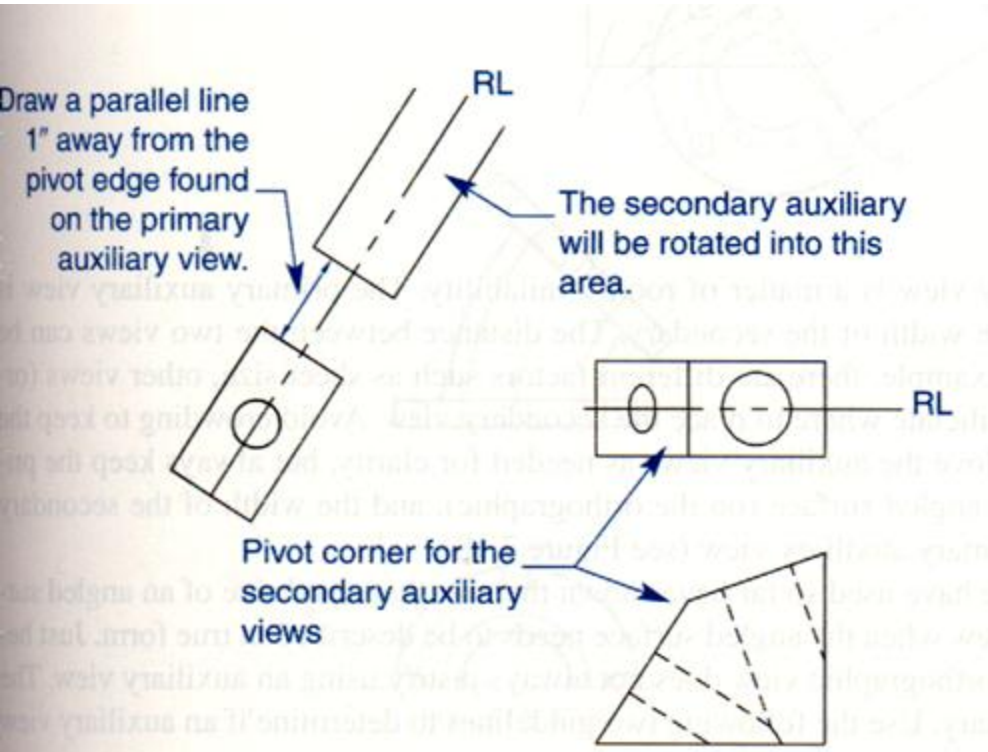


FIGURE 7.14 Location of the starting edge

Step 4: take true length measurements from angled surface on ORTHO view. Transfer to secondary AUX view

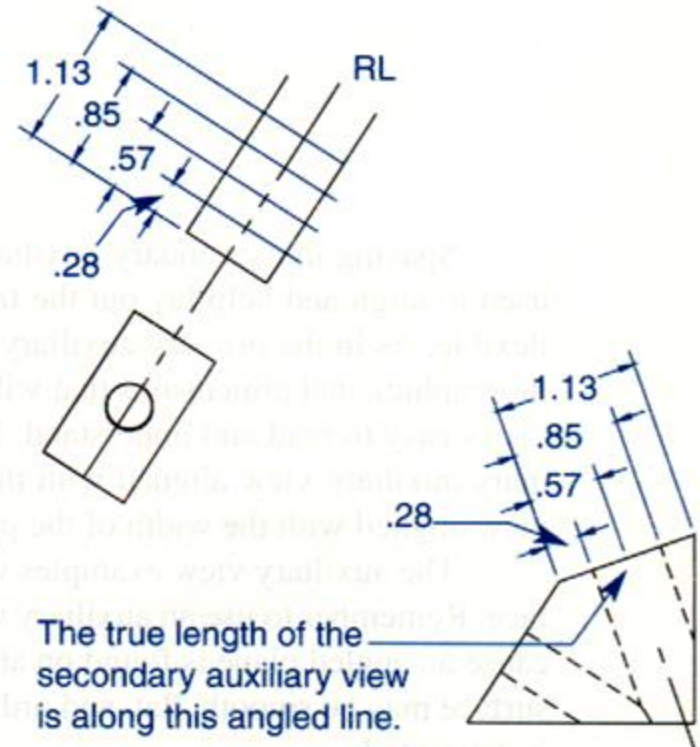


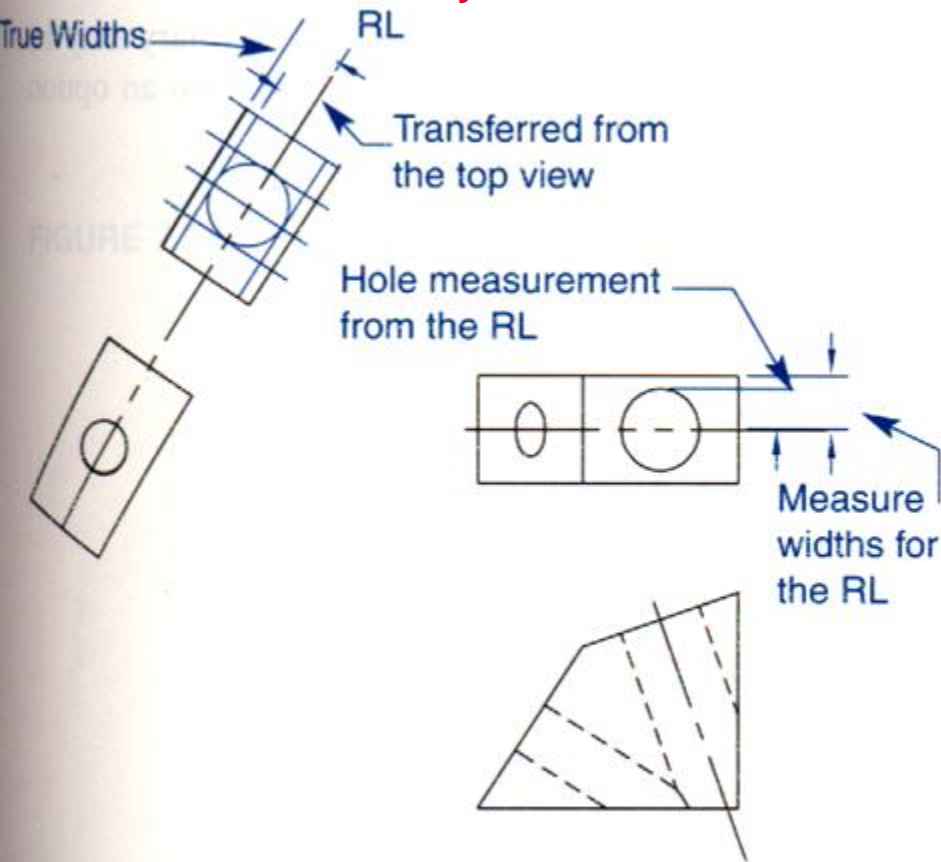
FIGURE 7.15 Transferring lengths to the secondary auxiliary view

MECH 220: 3rd LECTURE

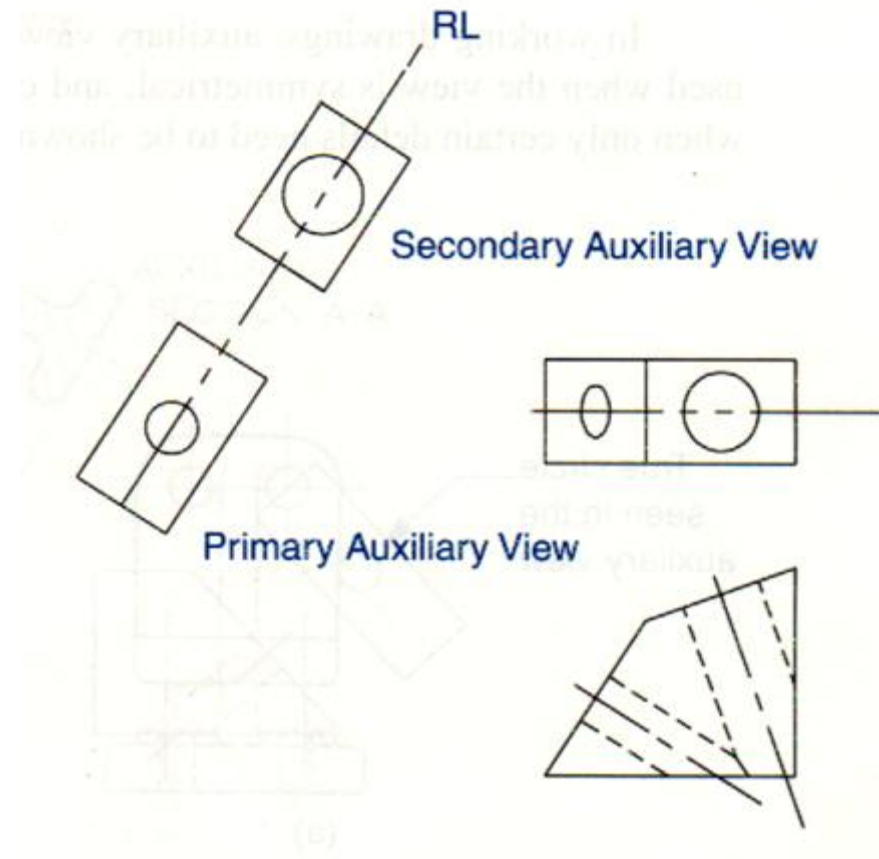
SECONDARY AUXILIARY VIEWS:

How to?

**Step 5: measure true widths from ORTHO view;
transfer to secondary AUX view**



Step 6: Complete the secondary AUX view



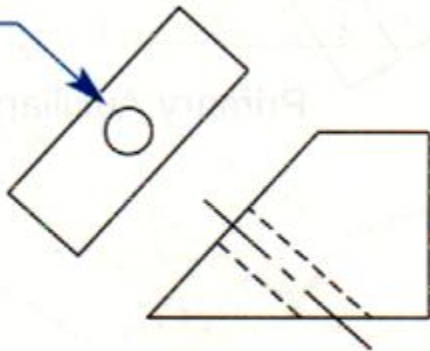
MECH 220: 3rd LECTURE

AUXILIARY VIEWS:

Benefits

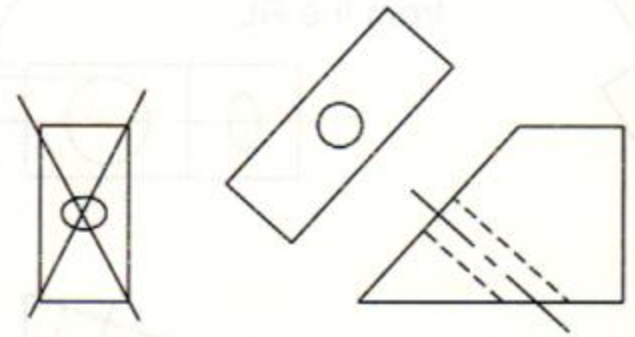
1) Display true geometry

True circle
seen in the
auxiliary view



(a)

2) May replace ORTHO views



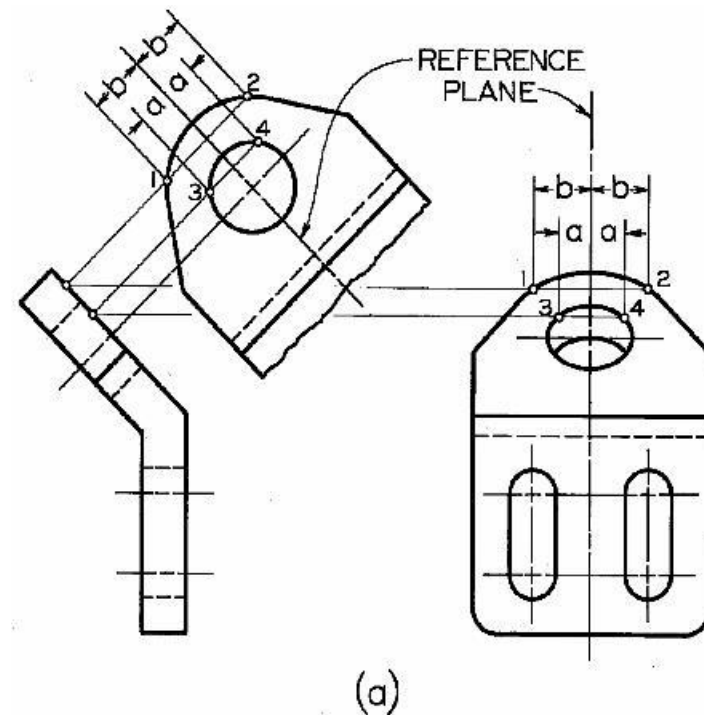
The left-side view shows only distorted geometry and can be replaced with the auxiliary view.

(b)

MECH 220: 3rd LECTURE

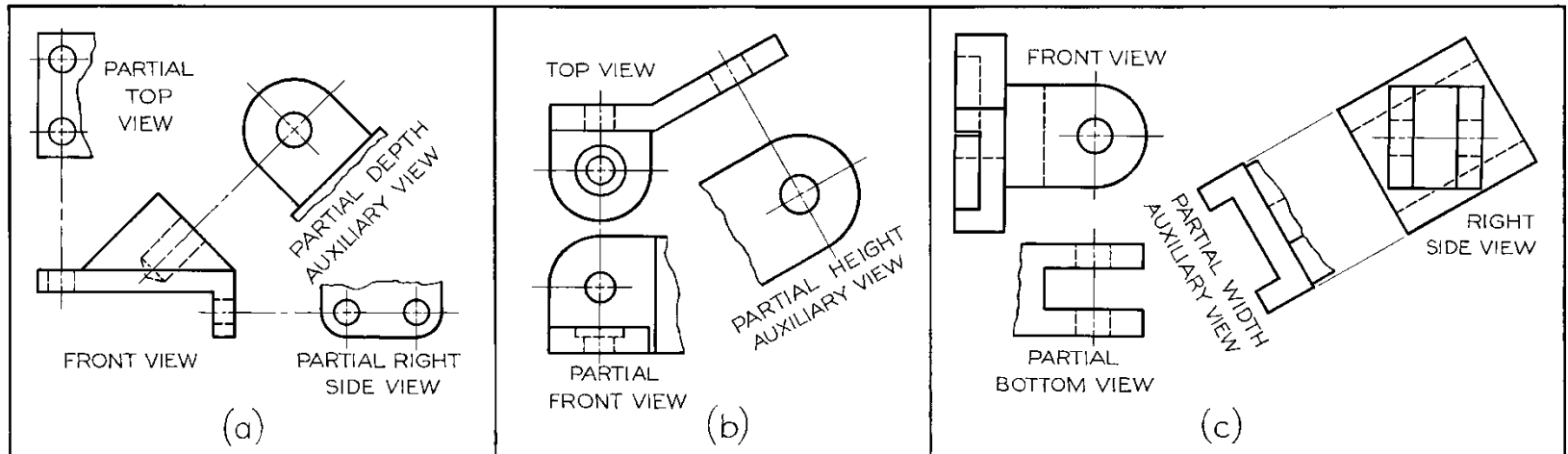
Reverse Construction

- ◆ It is also possible to generate orthographic views using primary or secondary auxiliary views.
- ◆ Reverse construction procedure:
 - Identify the reference plane on all views.
 - Identify reference points on the auxiliary view.
 - Using the Reference line and the available orthographic view identify your point on the front view.



MECH 220: 3rd LECTURE

Partial auxiliary views



Partial auxiliary views are frequently used. The entire view is unnecessary and often is difficult to read. Partial views should be connected to the view from which it is projected by a centerline or reference line so that it does not appear lost and unrelated to the other views. A break line can be used to indicate that the view is a partial view.

MECH 220: 3rd LECTURE

Assignment Due Next week

- ◆ **Assignment is posted on moodle**
- ◆ **A grided paper is available on moodle**

MECH 220: 3rd LECTURE

Auxiliary Views

Thank you