

Drafting

is the act and discipline of composing plans that visually communicate how something functions or has to be constructed.

Drafting is the visual language of industry and engineering.

Mr Regier

Pens/Pencils

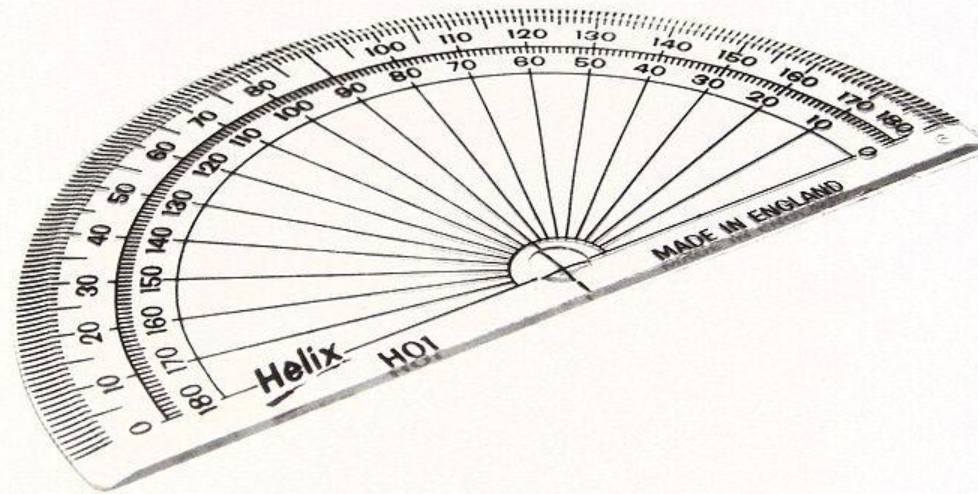
Quills
(Bird
Feathers)
With Ink
(Pigment
or dye)



Ebony and Ivory



Protractor (for measuring angles)



Pens/Pencils

General line widths are 0.18 mm, 0.25 mm, 0.5 mm and 0.7 mm. Hardness varies. Softer lead gives a better contrast, but harder lead gives more accurate track.

9H, 8H, ... , 2H, H, F, HB, B, 2B, ... , 8B, 9B (H for hard, B for Black)

where 9H is the hardest, 9B is the softest

#1 --- B

#2 --- HB

#2½ --- F

#3 --- H

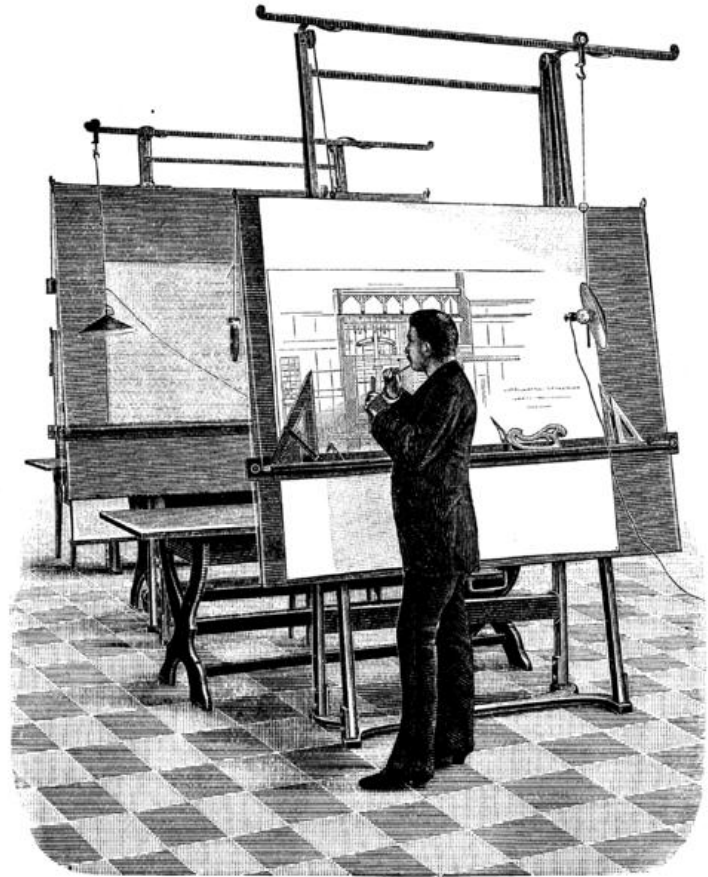
#4 --- 2H

The common #2, or HB grade pencil in the middle of the range, is considered to be the preferred grade for general purpose writing. Harder pencils are most often used for drafting purposes, while softer grades are usually preferred by artists.



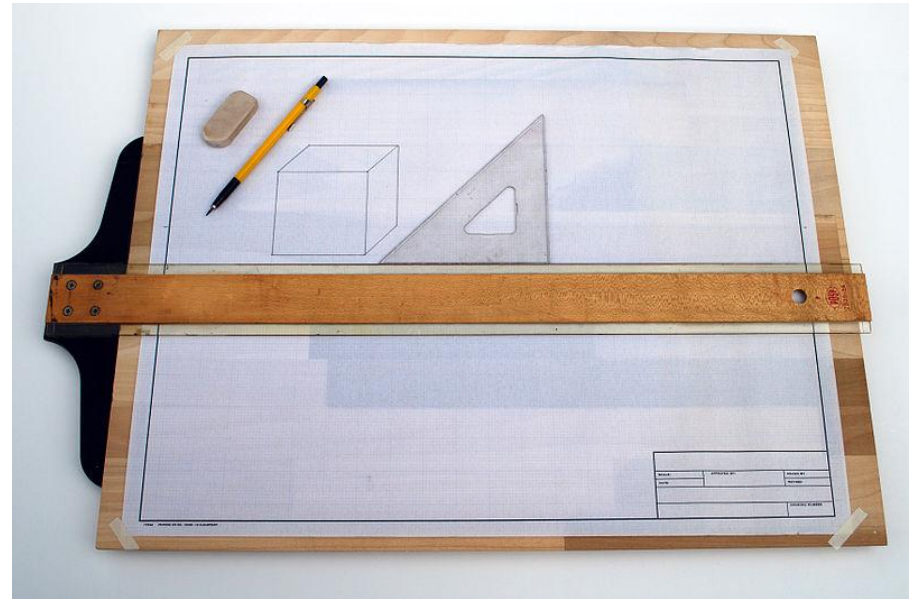
Drawing boards

an essential tool.
Paper will be
attached and kept
straight and still, so
that the drawing can
be done with
accuracy

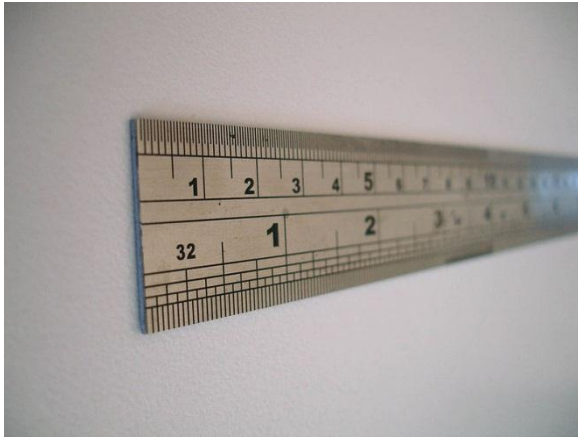


T Square

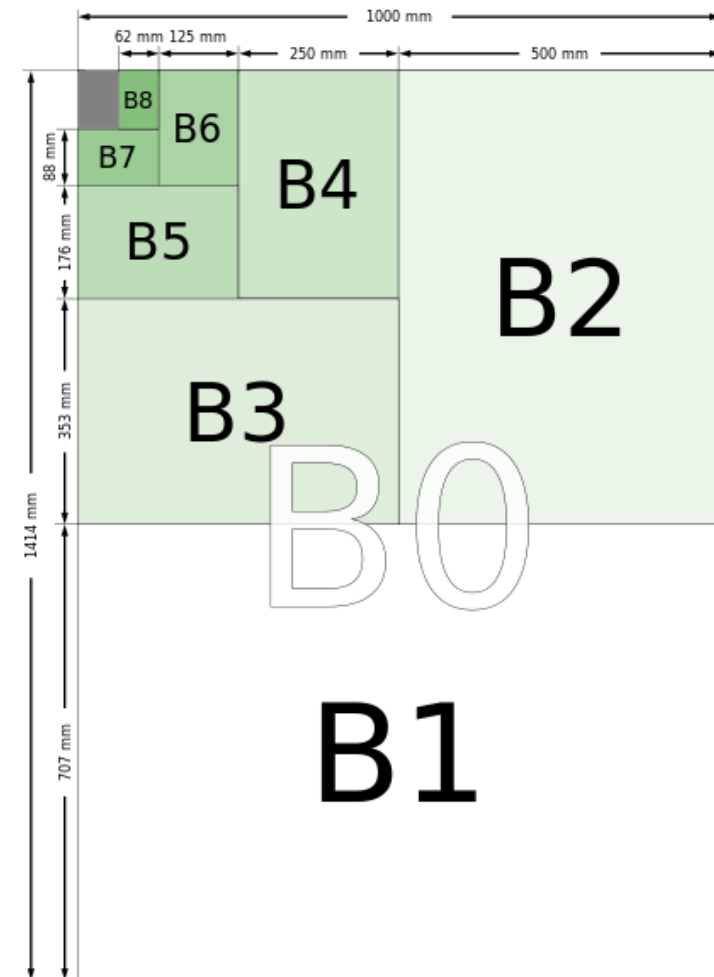
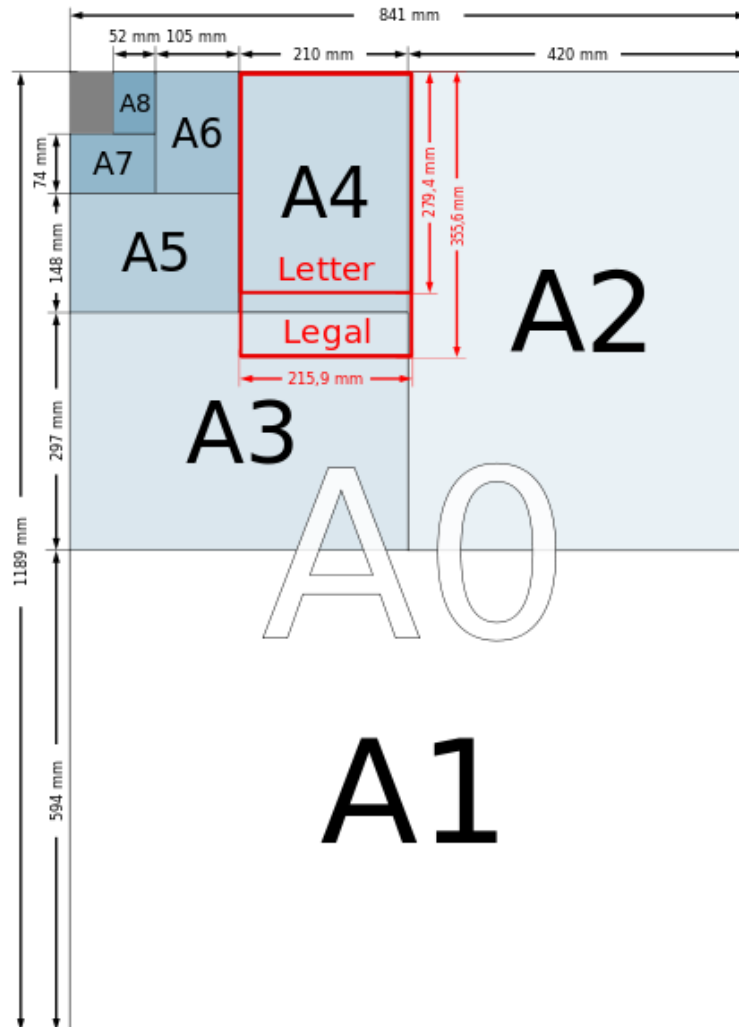
used by draftsman
primarily as a guide for
drawing horizontal lines
on drafting table. It may
also guide a set square to
draw vertical or diagonal
lines. Its name comes from
its resemblance to the
letter T



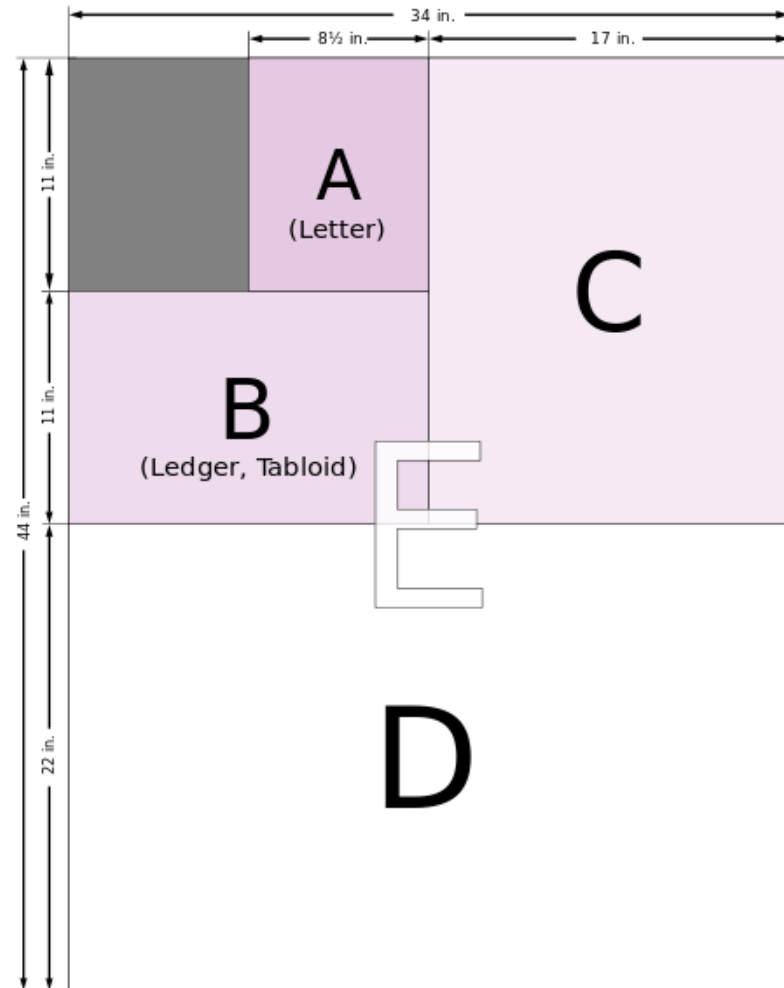
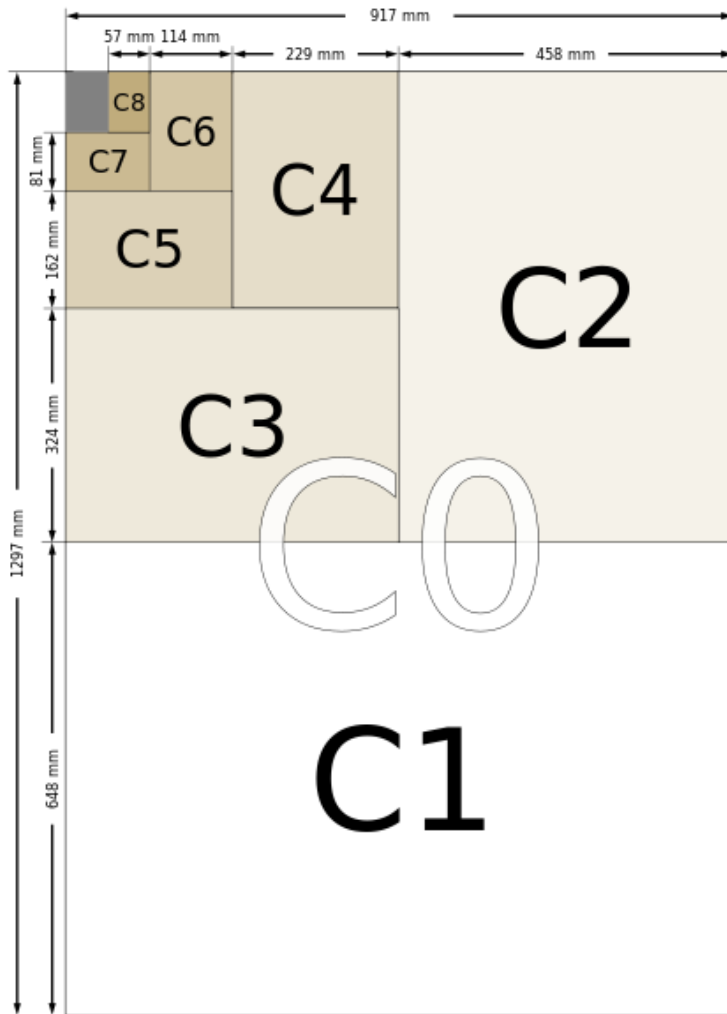
A ruler, sometimes called a rule or line gauge, is an instrument used in geometry, technical drawing, printing and engineering/building to measure distances and/or to rule straight lines.



Page sizes



Page sizes



Drafting 3 Types:

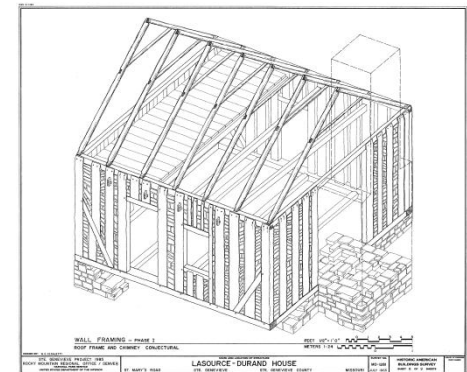
Process drawings: Sketches, preliminary



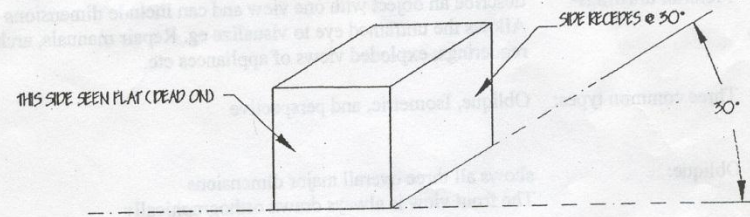
Construction documents: Working drawings, plans, elevations



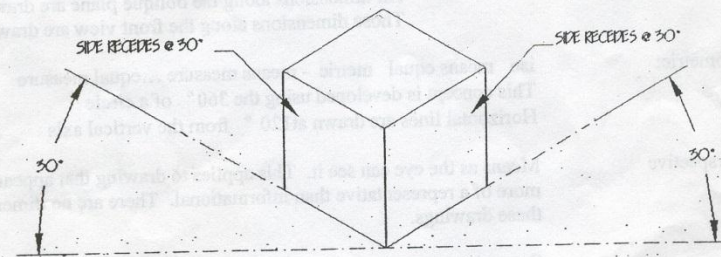
Presentation drawings: including Isometric, oblique, etc.



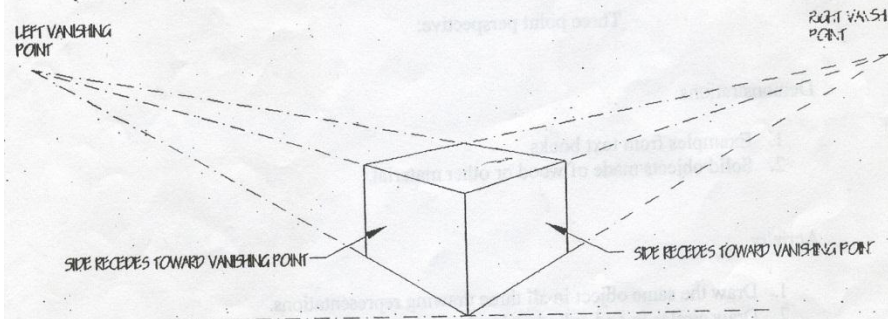
PICTORIAL DRAWINGS



OBLIQUE



ISOMETRIC



2 POINT PERSPECTIVE
(MOST REALISTIC)

Line weights

Line weights and line quality are very important:

Your drawings will be going to clients, other designers, manufactures, builders. Lines must be crisp so they are easy to reproduce.

Ink Pencil and CAD must all have 3 different line weights: Light, medium and bold. This is done to make the drawings easy to read and add artistic value.

Pencil lines should be solid and uniform throughout the page. i.e.) consistently dark.

Keep consistent pressure when drafting

Line weights

Bold lines: (soft B to 2B pencil lead in a .5 mm or a .7 mm mechanical pencil)

Bold lines are very dark and thick. Use for wall in plan view and the outline around the perimeter of a 3D view.

Medium lines: HB pencil lead in a .5 mm mechanical pencil

Secondary objects such as furnishings, doors counters, cabinets etc.

Light lines: (H to 2H pencil in a .3 mm to a .5 mm mechanical pencil)

Action, Information Lines, fill patterns. i.e. door swing direction, dimensions, hatch patterns. They should be light and “hard to see”

Line weights

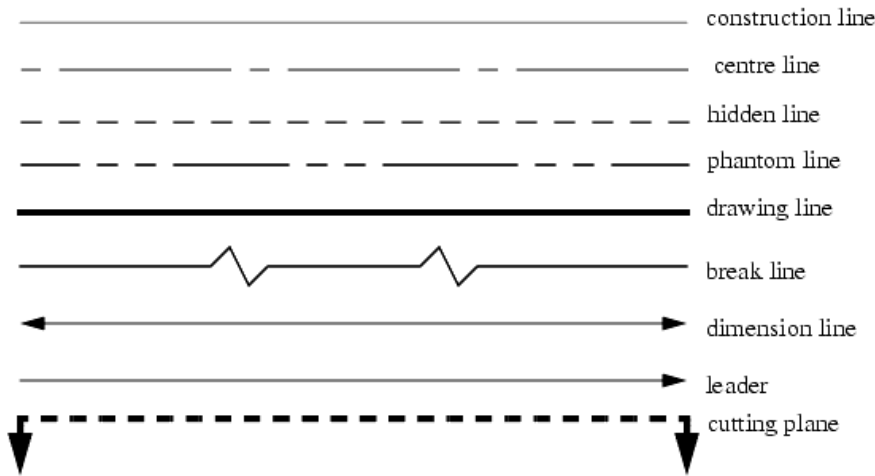
Solid Line: Solid lines are used to indicate visible objects that can be seen in plan, elevation or 3D views. Solid lines are also used for leader and dimension lines.

Dashed lines: These are used to shown hidden parts of an object. They re also used to indicated shelving or cabinets above a counter.

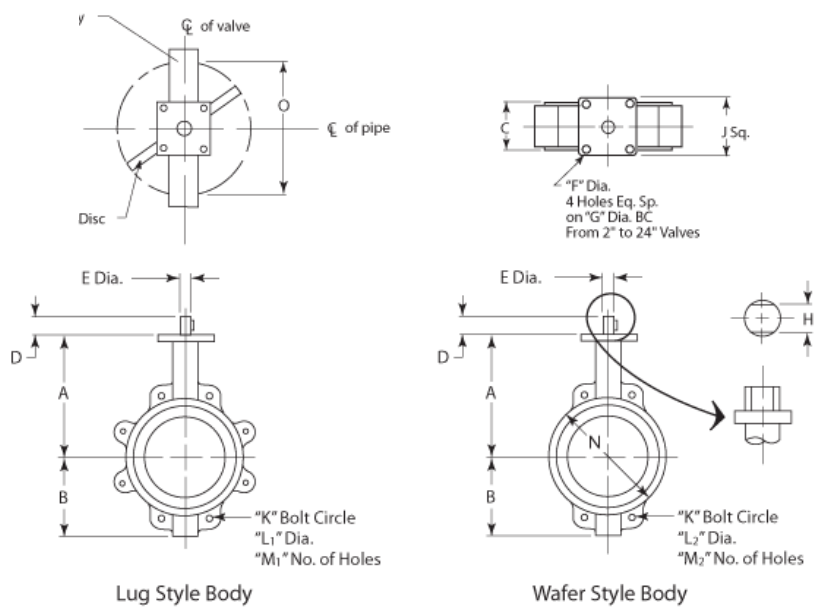
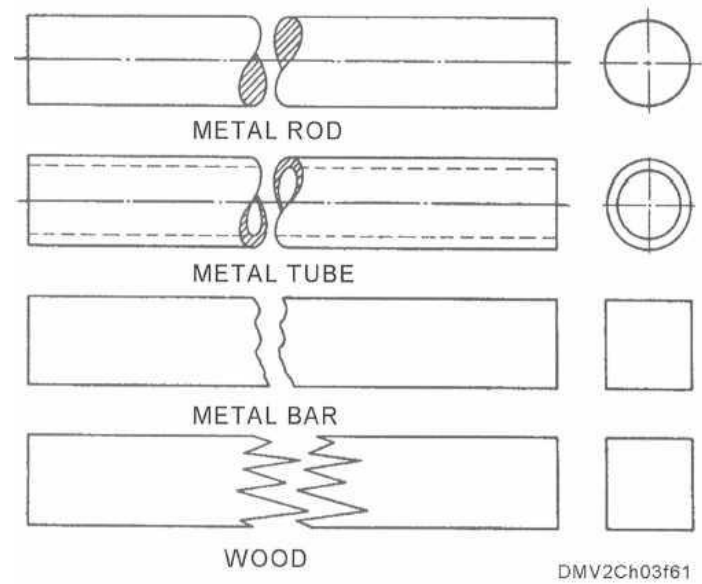


Leader line: Used to attach a note to object or line in a drawing.

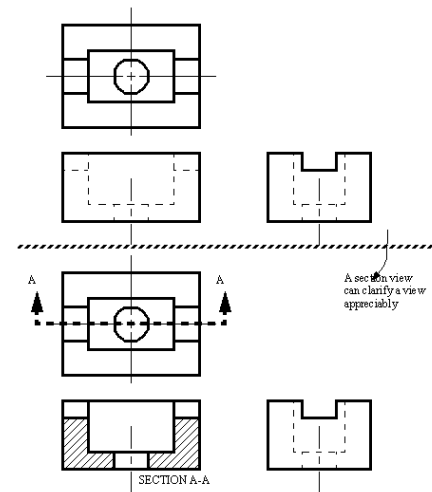
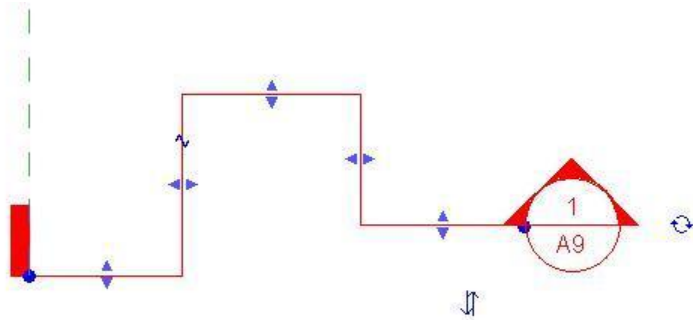
Break line: Are used when the extents of a drawing cannot fit on the size of paper being used for that drawing.



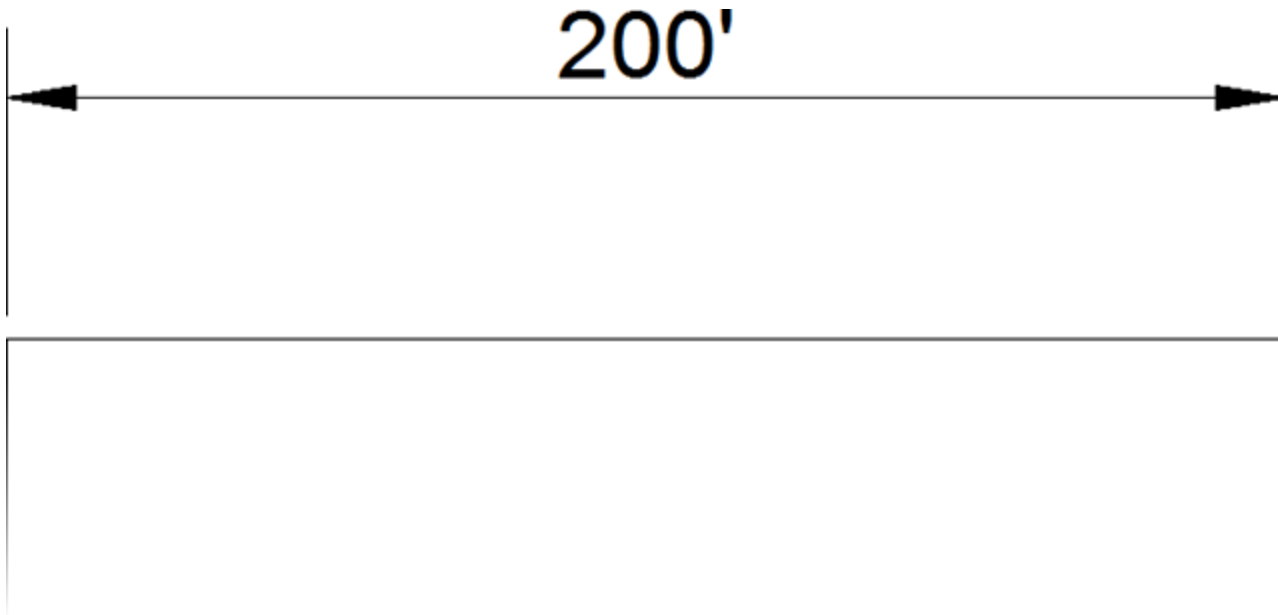
Center Line: Is used to indicate the center of a plan, object or circle, arc or any symmetrical object.



Section line: The section line is used to show a cutaway view of a floor plan. A section cutting all the way through a floor plan is referred to as a full section. The direction of the arrow shows the direction of the section view. The symbols on the end of the section line indicate the drawing number on the top and the page number the section will be located on the bottom.



Dimension line: The dimension line is used to show the measurement of an object.



Isometric view of a Feed Bracket. Dimensions include: 15°, 11, 5, 1, 15, 5.5, 6, 6, 7, 15°, 90°, 17, 20, 17, 11, 9, 17, 9, 20, 60, 2.7, 3.8, and SLOTTED 3 DR.

100'

This will be 15% in Ortho but not Iso
It must be drawn as you see it!

Scale

Scale 1:1 is the same on paper as real world

Scale 1:2 is larger by 2 in real life.

Map 1:100, 000

Architectural scale is 1:25 and up

Scale of 2:1 is half the size and these are the types that are.

Drawings with increasingly smaller scales are the fastest growing.

Why do you think?

We have 4 Elements
here.

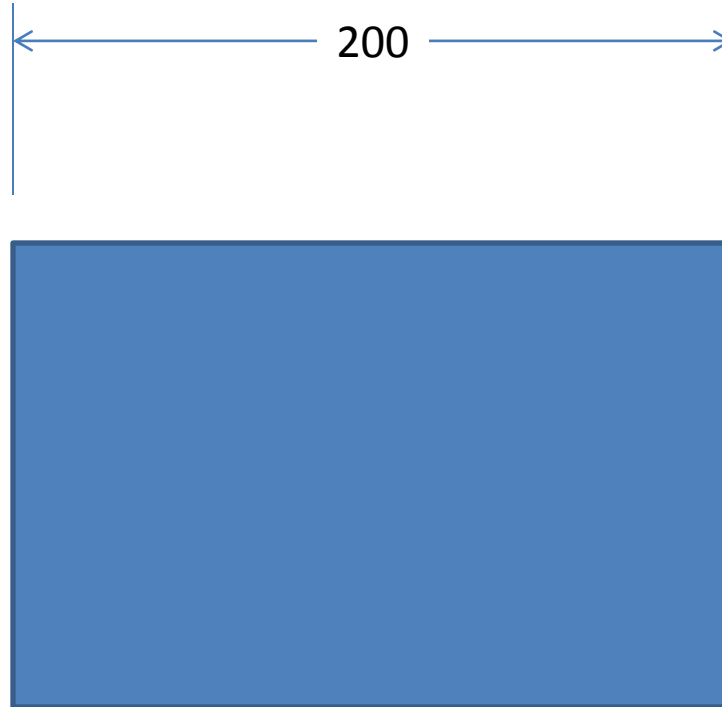
1 Object

2 Extension lines

3 Number

4 Arrows

All this together makes
a dimensioned Object

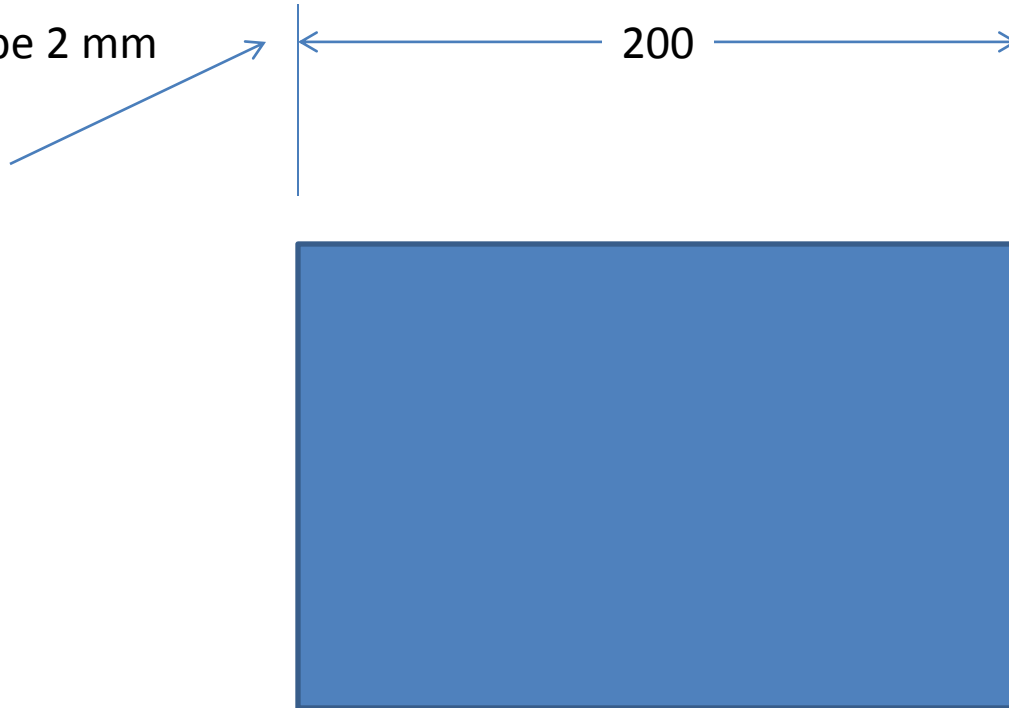


Object can not touch
Extension line

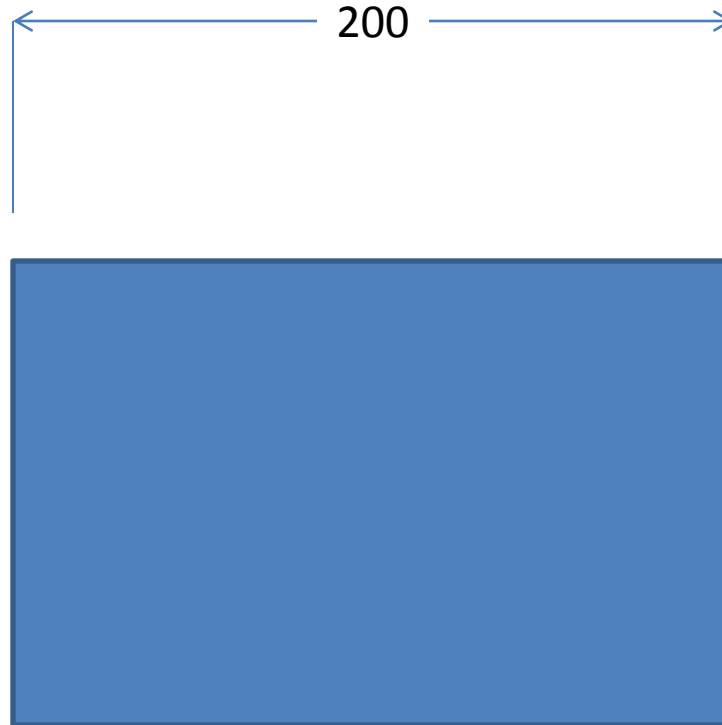
2 mm gap



Arrow has to be 2 mm
From top

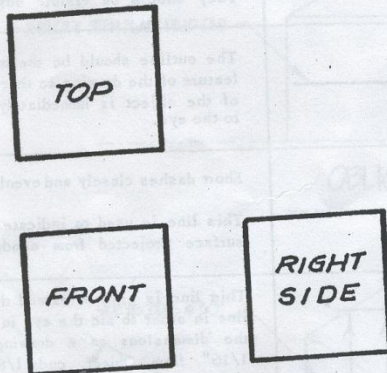


DO NOT DO
THIS!!



ISOMETRIC DRAWING

It is often necessary to make drawings of mechanical equipment for the use of untrained people who would find it difficult to read orthographic drawings. Illustrations for catalogues, sales brochures etc. require the type of drawing known as "pictorial".



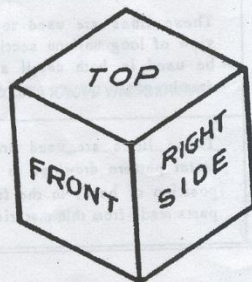
THE ORTHOGRAPHIC DRAWING

Work done in isometric can be divided into two classes:

- (a) Isometric Drawing (b) Isometric Projection

In (a) all lines are shown their true length, whereas in (b) allowance is made for the foreshortening that occurs as the line recedes from the eye. We will study only isometric drawing.

It should be noted that although the views obtained by isometric drawing are not true views, the pictorial value is just as good as in isometric projection.



THE ISOMETRIC DRAWING

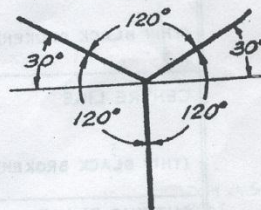
While artists might render an acceptable drawing of a machine part, the detail involved requires a more "scientific" method.

The simplest type of pictorial drawing is isometric drawing. The figure at left is an orthographic drawing of a cube, such as would be used in a machine shop. Three views are used to fully describe the part.

In isometric drawing only one view is drawn showing all three surfaces of the part.

Although isometric drawings are used for illustrations they do not describe the part as well as do orthographic drawings.

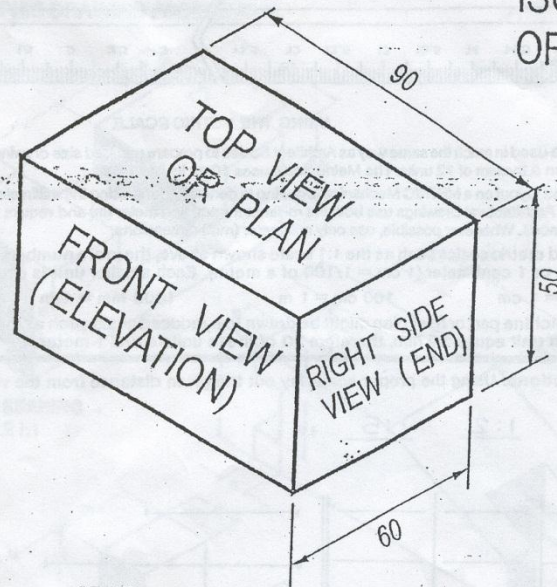
THE ISOMETRIC AXES



Isometric drawings are built on a frame of three lines representing the three edges of a cube. The intersection of these three lines forms three angles 120° . The lines are called isometric axes. One is drawn vertically, and the others at 30° to the horizontal sloping to the left and to the right. The intersection of these axes would be the front corner of a block with square corners as shown at left.

It should be noted that all heights, widths, and lengths are measured along or parallel to three isometric axes. True sizes are used.

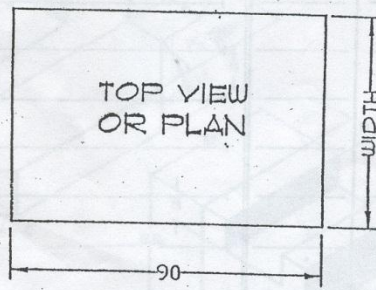
ISOMETRIC VIEW OF DEVELOPMENT



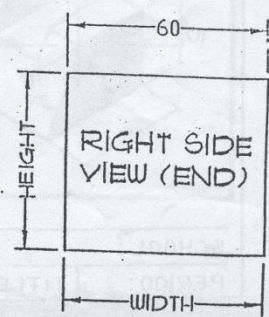
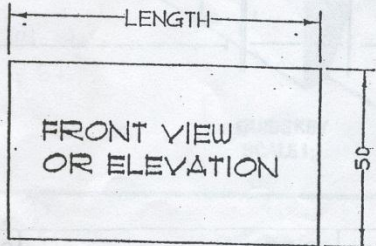
SCALE: FULL SIZE

Vertical centre

$$VC = \frac{175mm - (W + H + 40mm)}{2}$$



3 - VIEW ORTHOGRAPHIC
SCALE: 1:1



Horizontal Centre

$$HC = \frac{265mm - (L + W + 40mm)}{2}$$

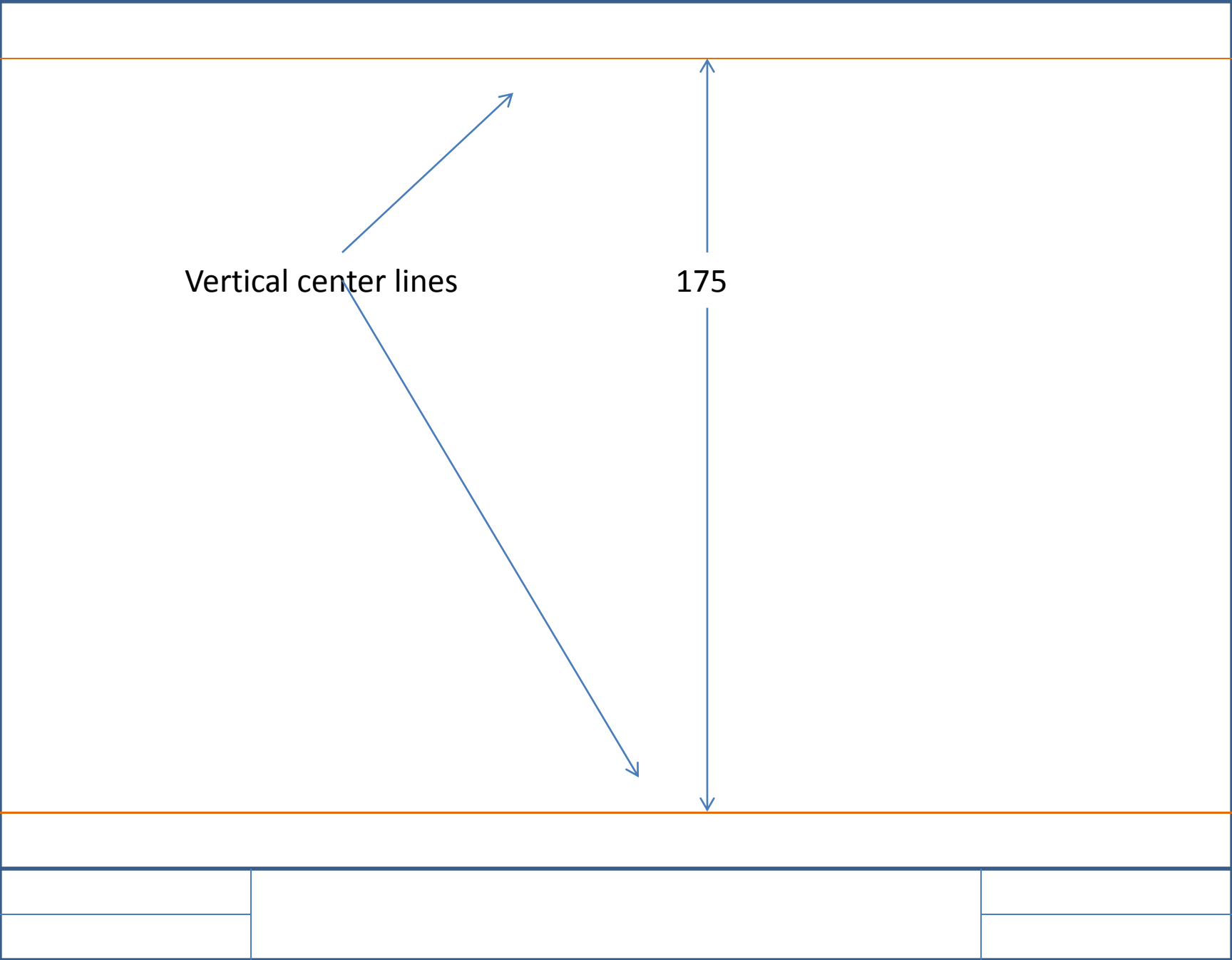
Must be copied down

Vertical Centre Calculation

$$VC = \frac{175 \text{ mm} - (W + H + 40 \text{ mm})}{2}$$

Horizontal center calculation

$$HC = \frac{265 \text{ mm} - (L + W + 40 \text{ mm})}{2}$$

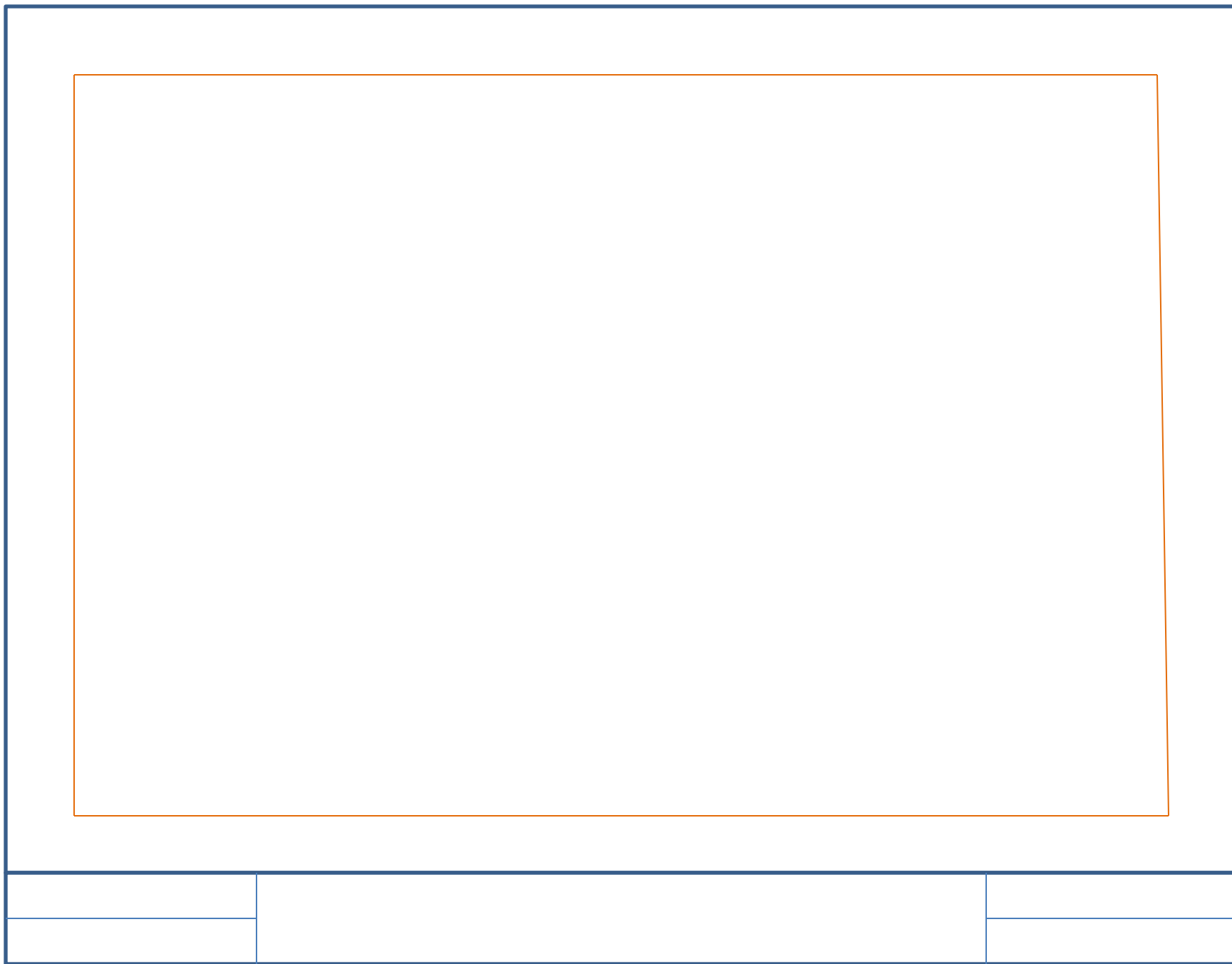




Horizontal center lines

The diagram shows a large rectangular frame defined by a dark blue border. Two vertical orange lines are positioned near the left and right edges of the frame. A horizontal blue line with arrowheads at both ends spans the distance between these two orange lines. The text 'Horizontal center lines' is placed to the left of the top arrowhead. The number '265' is placed in the center of the horizontal blue line.

265

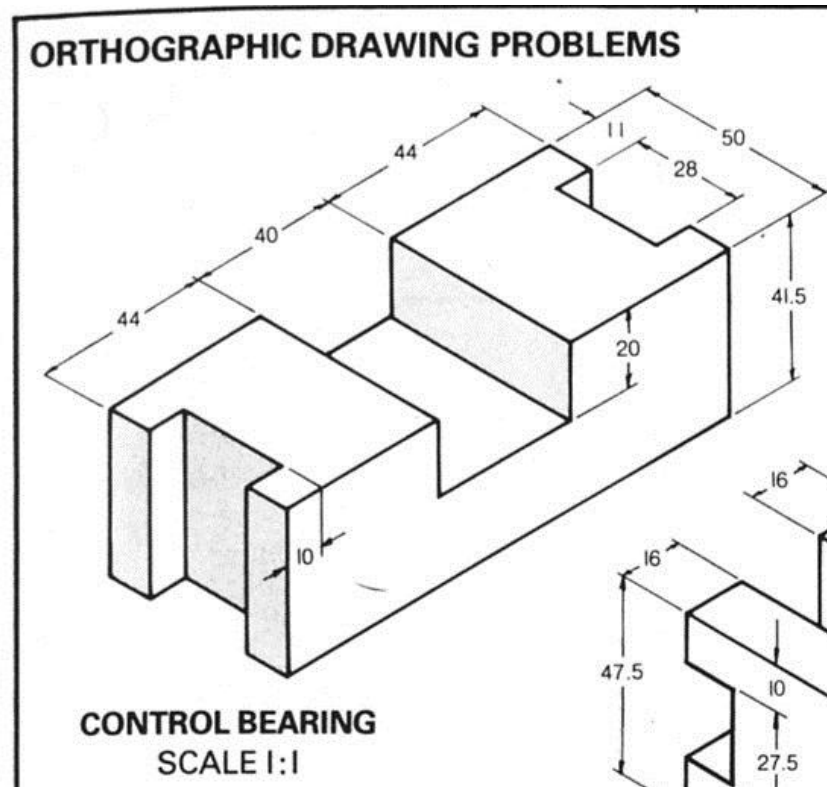


Example on white board

H=41.5mm

W=50mm

$L = 44 + 40 + 44$
 $= 128\text{mm}$



VC and HC use the distance that you are drawing on the paper.

If I have a Width of 26 mm on my object but my object has a scale of 2:1 I will be drawing that line on my paper as 52mm long. 52mm is used in the calculation NOT 26.




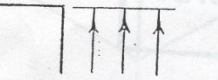
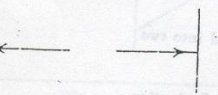

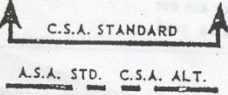

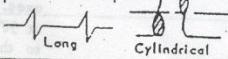
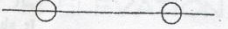
Also if my line said 108 and I had a scale of 1:2 my calculation and my line would use 54!

Drafting is as old as the hills (and going no where soon)

The ancient Egyptians are known to
have used wooden corner rulers
and were adept at sketching!!

Get better!, you will communicating
your ideas more effectively. More
practice more better 😊

For Reference

NAME	APPEARANCE	USE AND DESCRIPTION
CONSTRUCTION LINE (VERY THIN FULL)		These lines are used to construct layouts of the finished drawing. All lines should begin as construction lines. They should be visible only to you.
OBJECT LINE (THICK BLACK FULL)		The outline should be the outstanding feature of the drawing so that the shape of the object is immediately apparent to the eye.
HIDDEN LINE (MEDIUM BLACK BROKEN)		Short dashes closely and evenly spaced. This line is used to indicate a hidden surface projected from another view.
EXTENSION LINE (THIN BLACK FULL)		This line is used to extend the object line in order to aid the eye in locating the dimensions on a drawing. Starts 1/16" from Object, ends 1/8" past dimension line.
DIMENSION LINE (THIN BLACK BROKEN)		This line indicates the span of the Dimension. Usually ends with arrowheads. Broken at the centre to admit Numerals.
CENTRE LINE (THIN BLACK BROKEN)		Used to locate the centre of holes. Also axis of symmetry on parts of uniform section. Long dashes 1/4" to 1/2", 1/16" spaces, short dashes 1/8".
CUTTING PLANE LINES (EXTRA THICK BLACK FULL)		These lines indicate the point at which a Section is imagined to be cut, and a portion removed. Arrowheads indicate the direction of sight.
SHORT BREAK LINE (MEDIUM BLACK FULL)		These lines are used to shorten the view of long uniform sections and may be used in both detail and assembly drawings.
LONG BREAK LINE (THIN BLACK BROKEN)		
BEND LINE (THIN BLACK FULL)		These lines are used only on sheet metal pattern drawings to indicate the position of bends in the fabrication of parts made from thin materials.