# Engineering Graphics

(Projection of points)

Dr.P.M. Ajith

https://meet.google.com/wdd-dipp-gvw

# ORTHOGRAPHIC PROJECTIONS:

**IT IS A TECHNICAL DRAWING IN WHICH DIFFERENT VIEWS OF AN OBJECT ARE PROJECTED ON DIFFERENT REFERENCE PLANES OBSERVING PERPENDICULAR TO RESPECTIVE REFERENCE PLANE**

**Different Reference planes are**

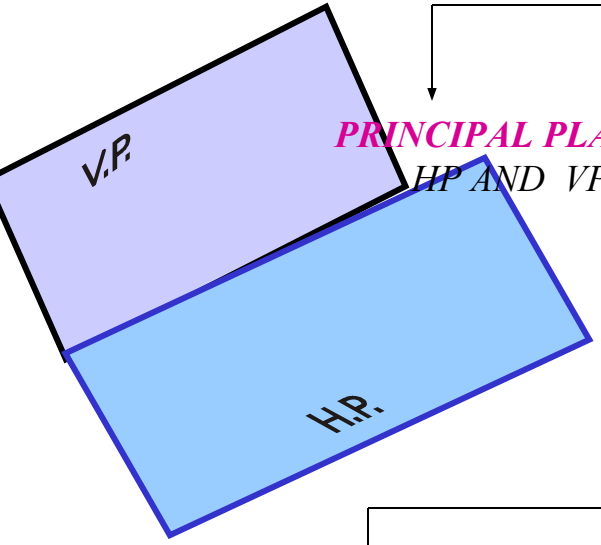
**Horizontal Plane (HP),**
**Vertical Frontal Plane ( VP )**
**Side Or Profile Plane ( PP)**

**And**

**Different Views are Front View (FV), Top View (TV) and Side View (SV)**

**FV is a view projected on VP.**
**TV is a view projected on HP.**
**SV is a view projected on PP.**

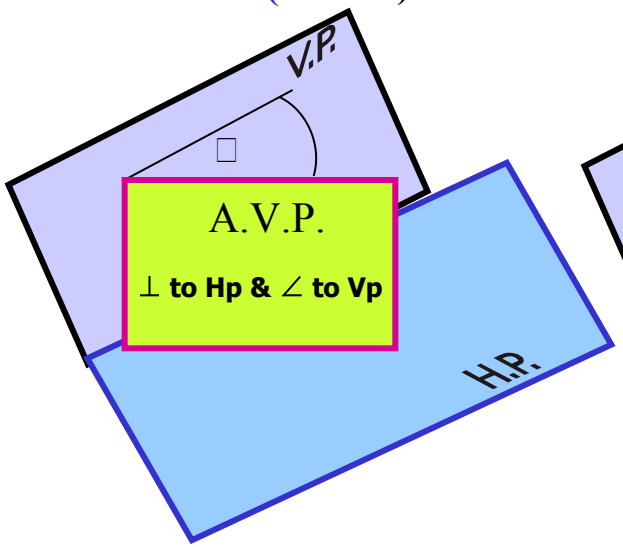
# PLANES



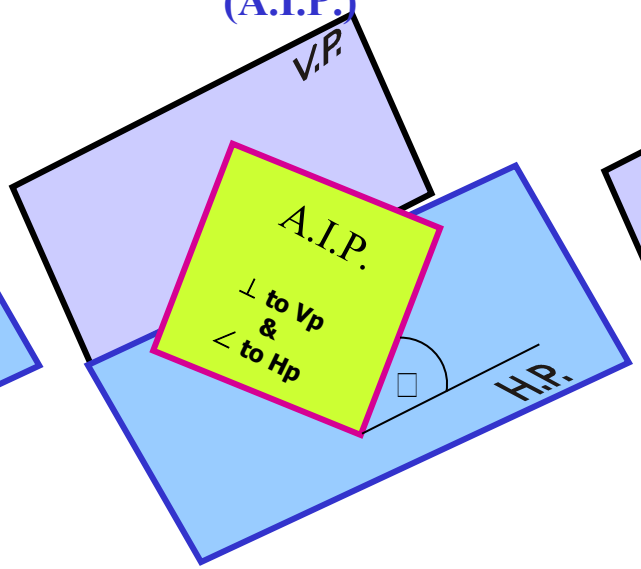

***PRINCIPAL PLANES***
*HP AND VP*

***AUXILIARY PLANES***

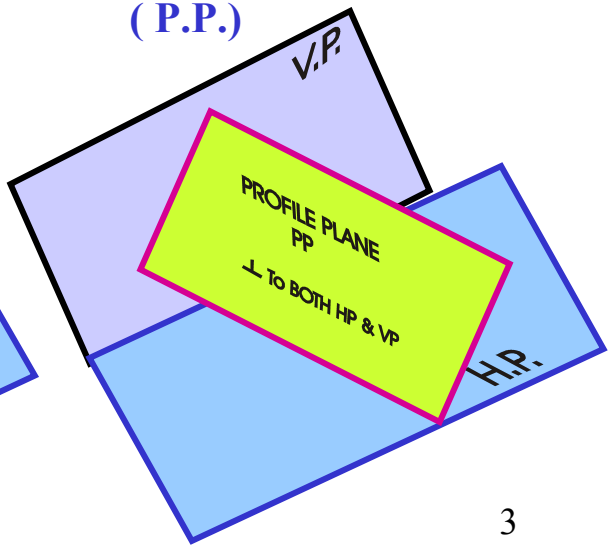
**Auxiliary Vertical Plane (A.V.P.)**



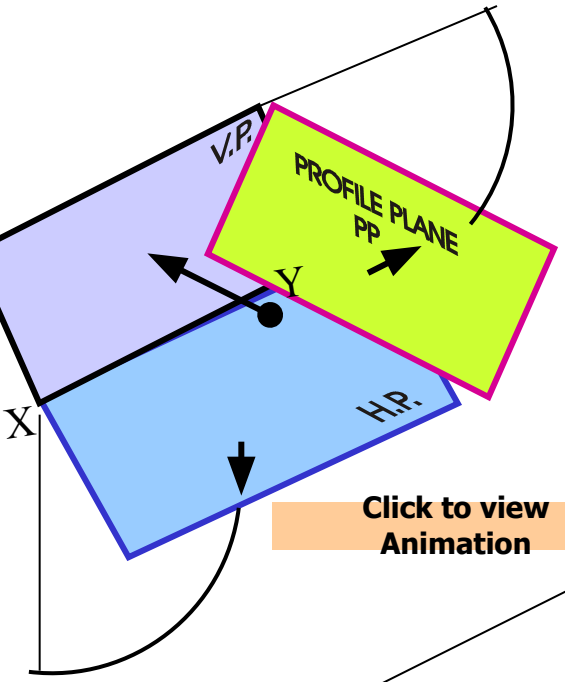

**Auxiliary Inclined Plane (A.I.P.)**




**Profile Plane ( P.P.)**



# PATTERN OF PLANES & VIEWS (First Angle Method)



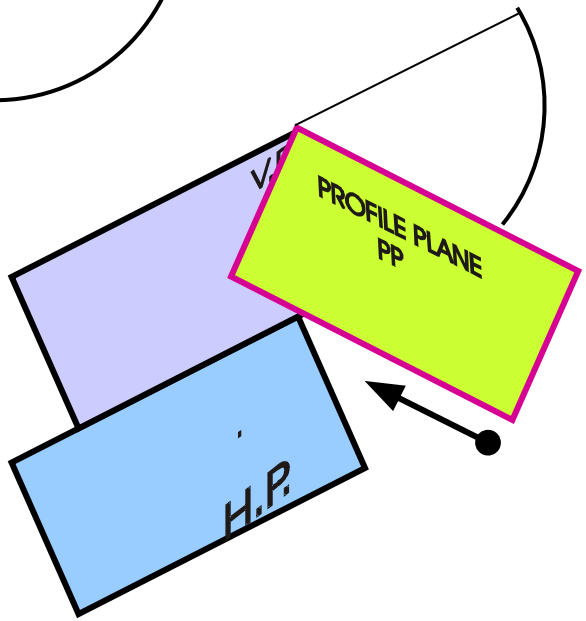

THIS IS A PICTORIAL SET-UP OF ALL THREE PLANES.
ARROW DIRECTION IS A NORMAL WAY OF OBSERVING THE OBJECT.
BUT IN THIS DIRECTION ONLY VP AND A VIEW ON IT (FV) CAN BE SEEN.
THE OTHER PLANES AND VIEWS ON THOSE CAN NOT BE SEEN.

***PROCEDURE TO SOLVE ABOVE PROBLEM:-***

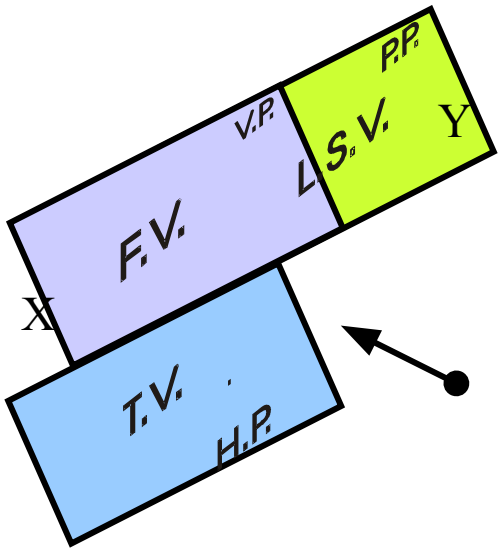
TO MAKE THOSE PLANES ALSO VISIBLE FROM THE ARROW DIRECTION,
A) HP IS ROTATED $90^0$ DOWNWARD
B) PP, $90^0$ IN RIGHT SIDE DIRECTION.
THIS WAY BOTH PLANES ARE BROUGHT IN THE SAME PLANE CONTAINING VP.

**Click to view Animation**

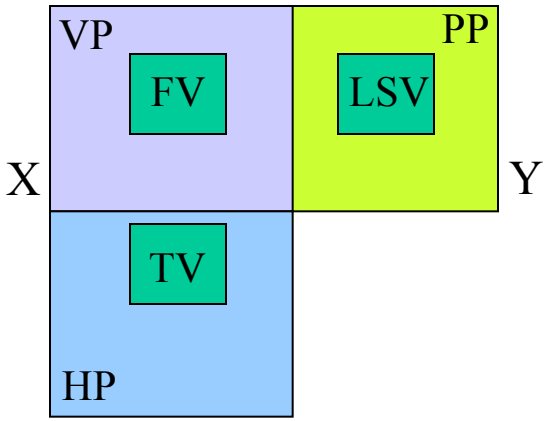
On clicking the button if a warning comes please click YES to continue, this program is safe for your pc.




HP IS ROTATED DOWNWARD $90^0$
AND
BROUGHT IN THE PLANE OF VP.




PP IS ROTATED IN RIGHT SIDE $90^0$
AND
BROUGHT IN THE PLANE OF VP.




ACTUAL PATTERN OF PLANES & VIEWS
OF ORTHOGRAPHIC PROJECTIONS
DRAWN IN
FIRST ANGLE METHOD OF PROJECTIONS

# ORTHOGRAPHIC PROJECTIONS

## OF POINTS, LINES, PLANES, AND SOLIDS.

## TO DRAW PROJECTIONS OF ANY OBJECT, ONE MUST HAVE FOLLOWING INFORMATION

A) **OBJECT**

{ WITH IT'S DESCRIPTION, WELL DEFINED.}

B) **OBSERVER**

{ ALWAYS OBSERVING PERPENDICULAR TO RESP. REF. PLANE}.

C) **LOCATION OF OBJECT**,

{ MEANS IT'S POSITION WITH REFERENCE TO H.P. & V.P.}

TERMS 'ABOVE' & 'BELOW' WITH RESPECTIVE TO H.P.
AND TERMS 'INFRONT' & 'BEHIND' WITH RESPECTIVE TO V.P
FORM 4 QUADRANTS.
OBJECTS CAN BE PLACED IN ANY ONE OF THESE 4 QUADRANTS.

IT IS INTERESTING TO LEARN THE EFFECT ON THE POSITIONS OF VIEWS ( FV, TV ) OF THE OBJECT WITH RESP. TO X-Y LINE, WHEN PLACED IN DIFFERENT QUADRANTS.

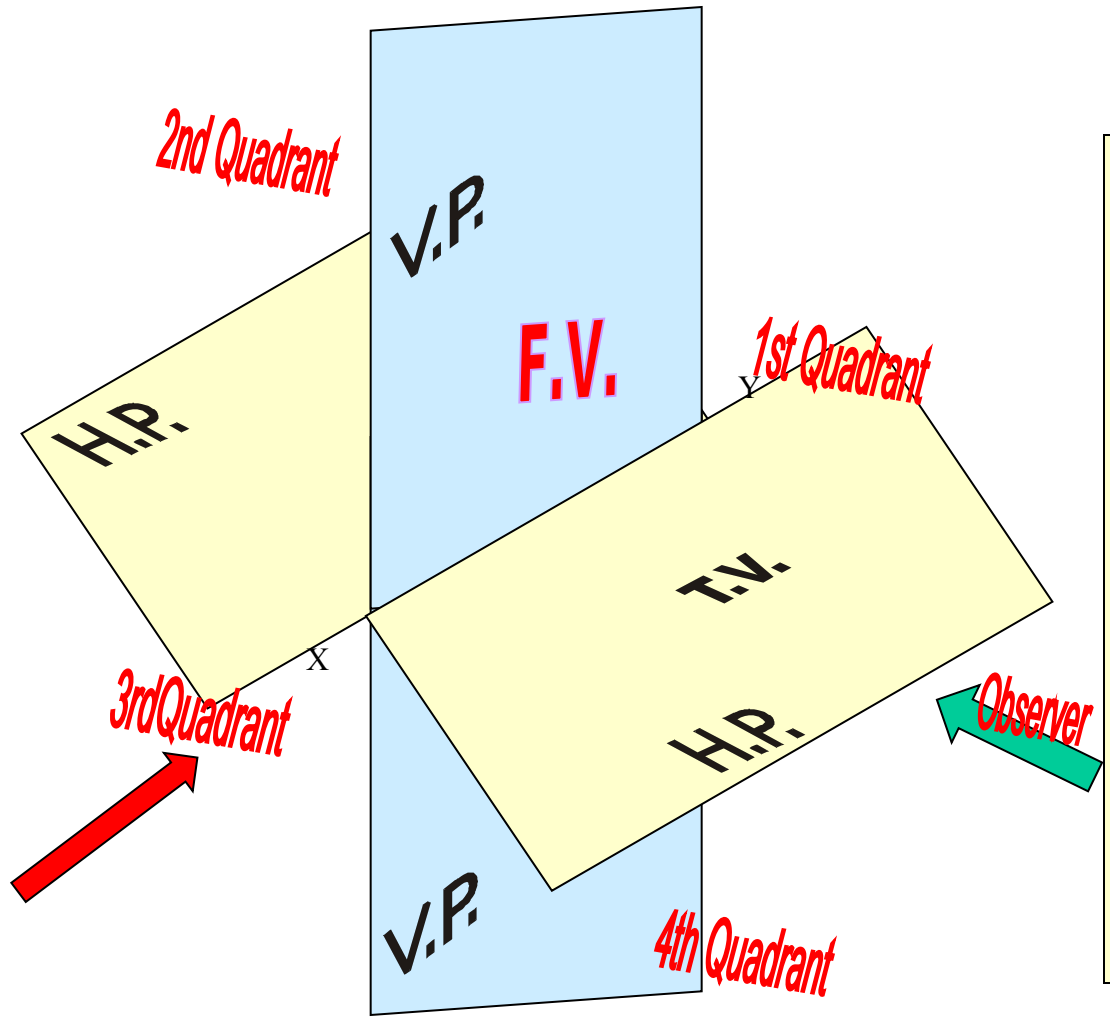
*STUDY ILLUSTRATIONS GIVEN ON NEXT PAGES AND NOTE THE RESULTS. TO MAKE IT EASY HERE A POINT (A) IS TAKEN AS AN OBJECT. BECAUSE IT'S ALL VIEWS ARE JUST POINTS.*

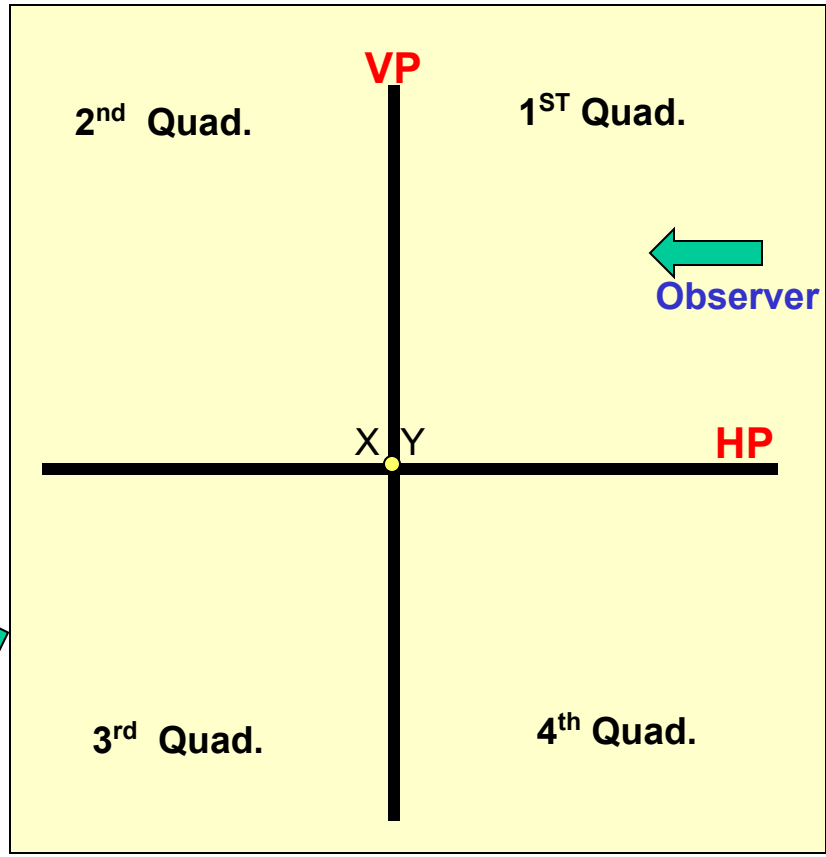
# NOTATIONS

**FOLLOWING NOTATIONS SHOULD BE FOLLOWED WHILE NAMEING DIFFERENT VIEWS IN ORTHOGRAPHIC PROJECTIONS.**

| OBJECT | POINT A | LINE AB |
|---|---|---|
| IT'S TOP VIEW | a | a b |
| IT'S FRONT VIEW | a' | a' b' |
| IT'S SIDE VIEW | a" | a" b" |

***SAME SYSTEM OF NOTATIONS SHOULD BE FOLLOWED INCASE NUMBERS, LIKE 1, 2, 3 – ARE USED.***



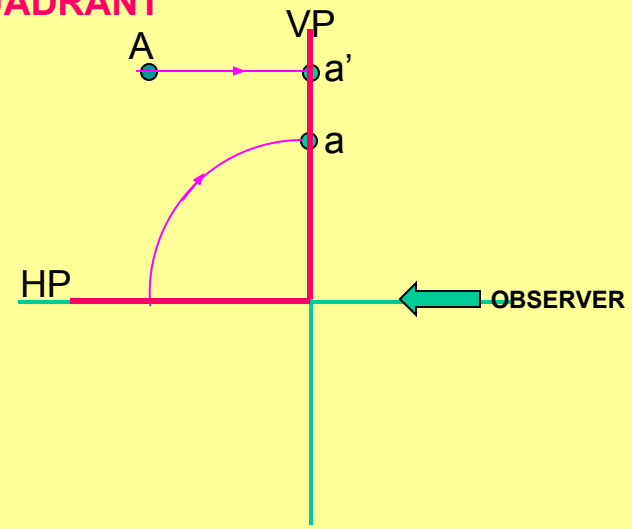




**THIS QUADRANT PATTERN,**
**IF OBSERVED ALONG X-Y LINE ( IN RED ARROW DIRECTION)**
**WILL EXACTLY APPEAR AS SHOWN ON RIGHT SIDE AND HENCE,**
**IT IS FURTHER USED TO UNDERSTAND ILLUSTRATION PROPERLY.**

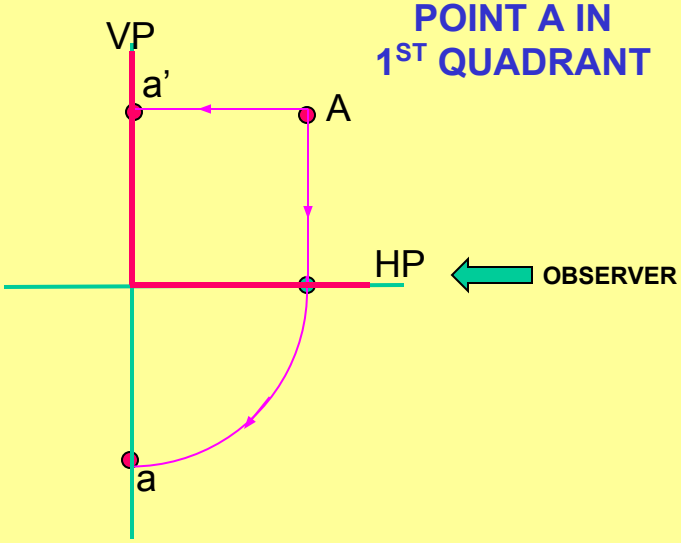
Point A is Placed In different quadrants and it's Fv & Tv are brought in same plane for Observer to see clearly.
Fv is visible as it is a view on VP. But as Tv is is a view on Hp, it is rotated downward $90^0$, In clockwise direction.The In front part of Hp comes below xy line and the part behind Vp comes above.

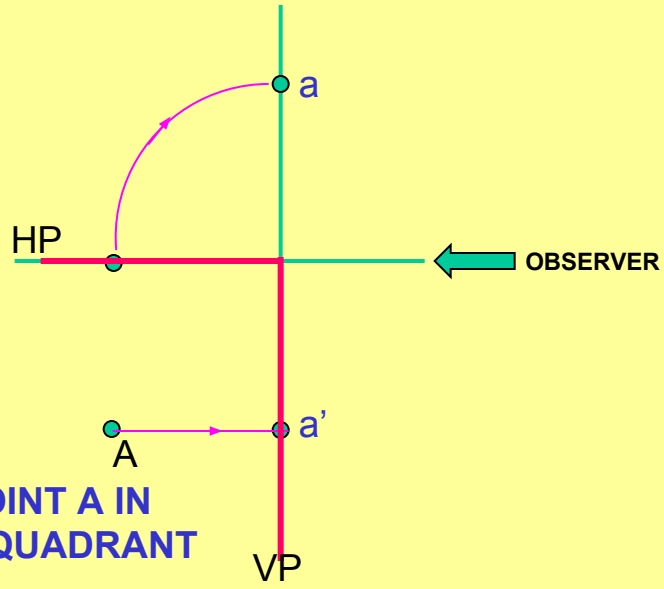
Observe and note the process.

## POINT A IN 2ND QUADRANT

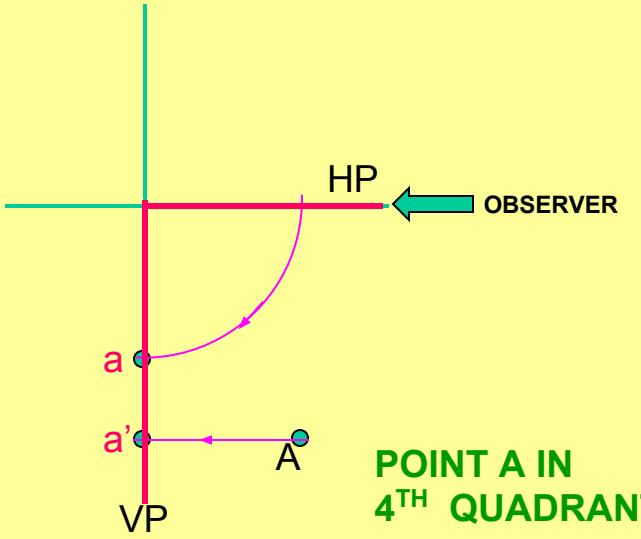



## POINT A IN 1ST QUADRANT



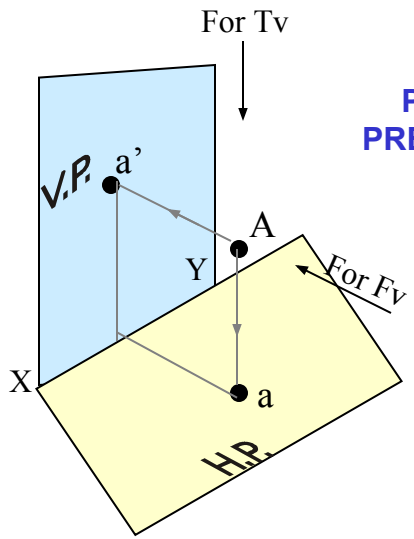

## POINT A IN 3RD QUADRANT




## POINT A IN 4TH QUADRANT

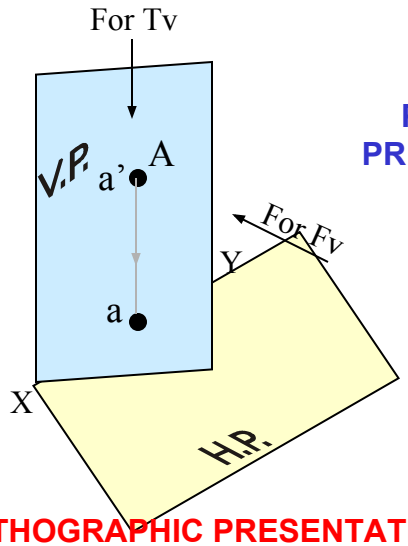
# PROJECTIONS OF A POINT IN FIRST QUADRANT.

**POINT A ABOVE HP & INFRONT OF VP**



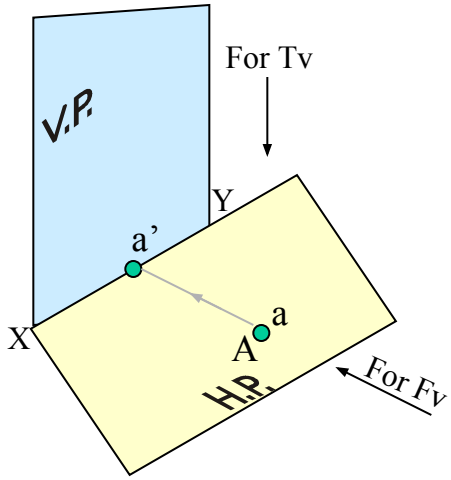

PICTORIAL PRESENTATION

**POINT A ABOVE HP & IN VP**



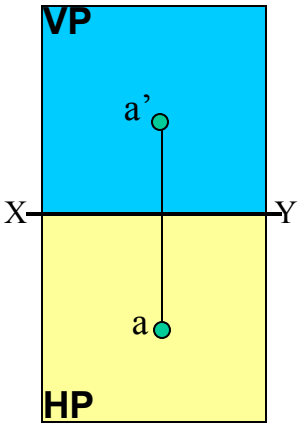

PICTORIAL PRESENTATION

**POINT A IN HP & INFRONT OF VP**

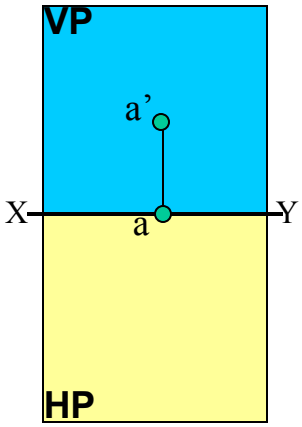



**ORTHOGRAPHIC PRESENTATIONS OF ALL ABOVE CASES.**

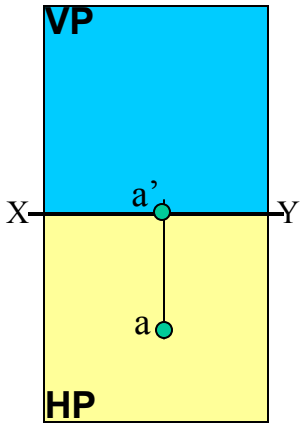
***Fv above xy, Tv below xy.***



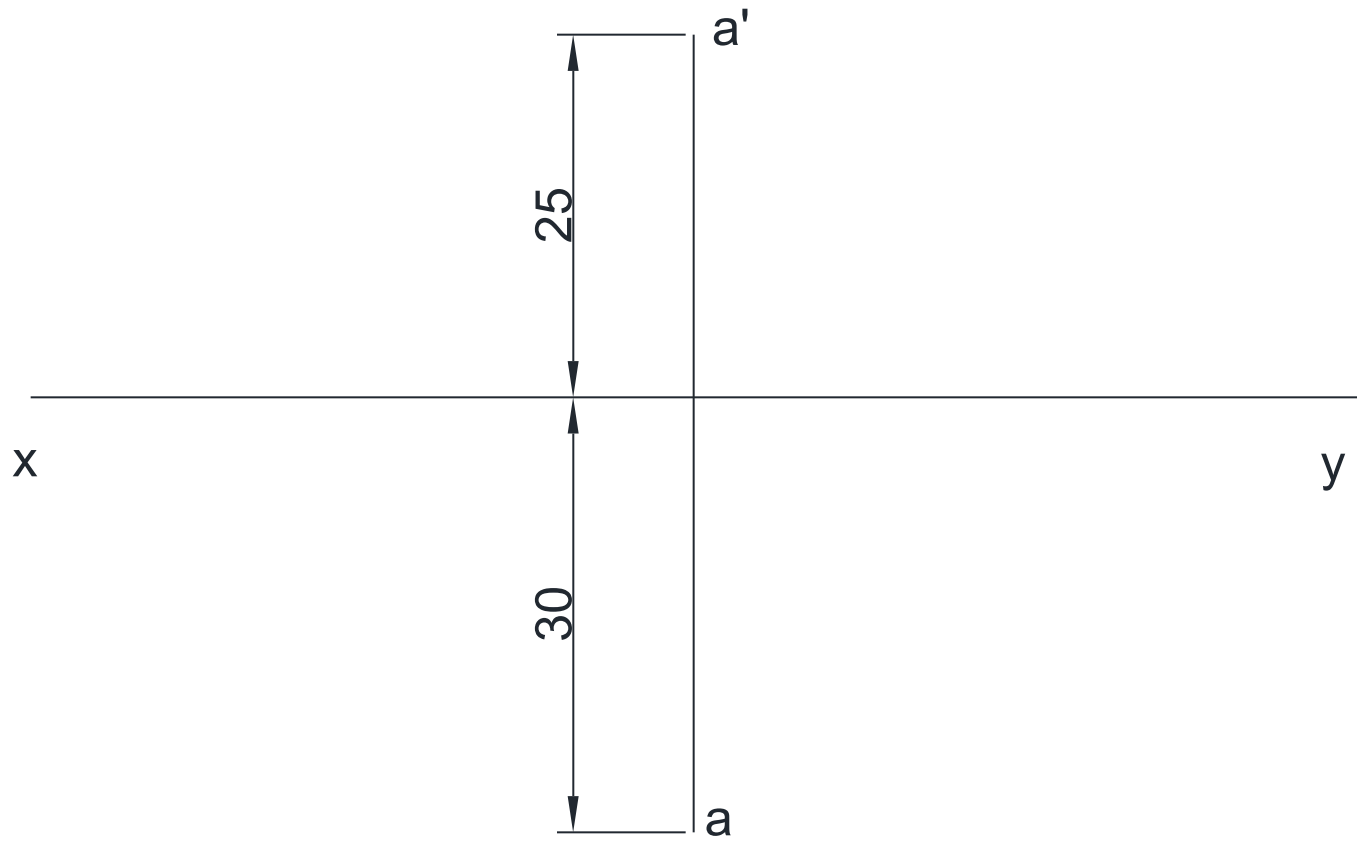

***Fv above xy, Tv on xy.***



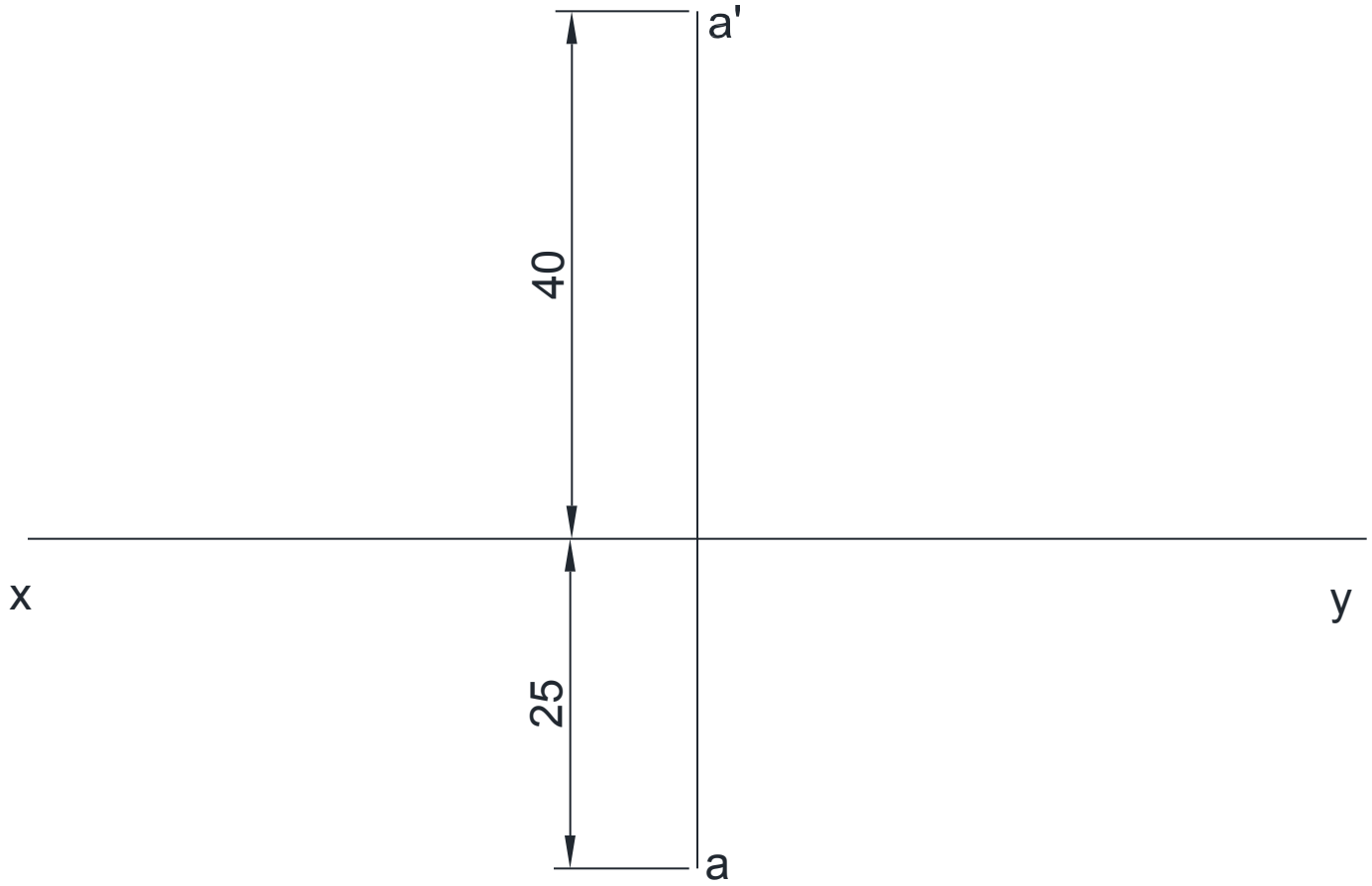

***Fv on xy, Tv below xy.***



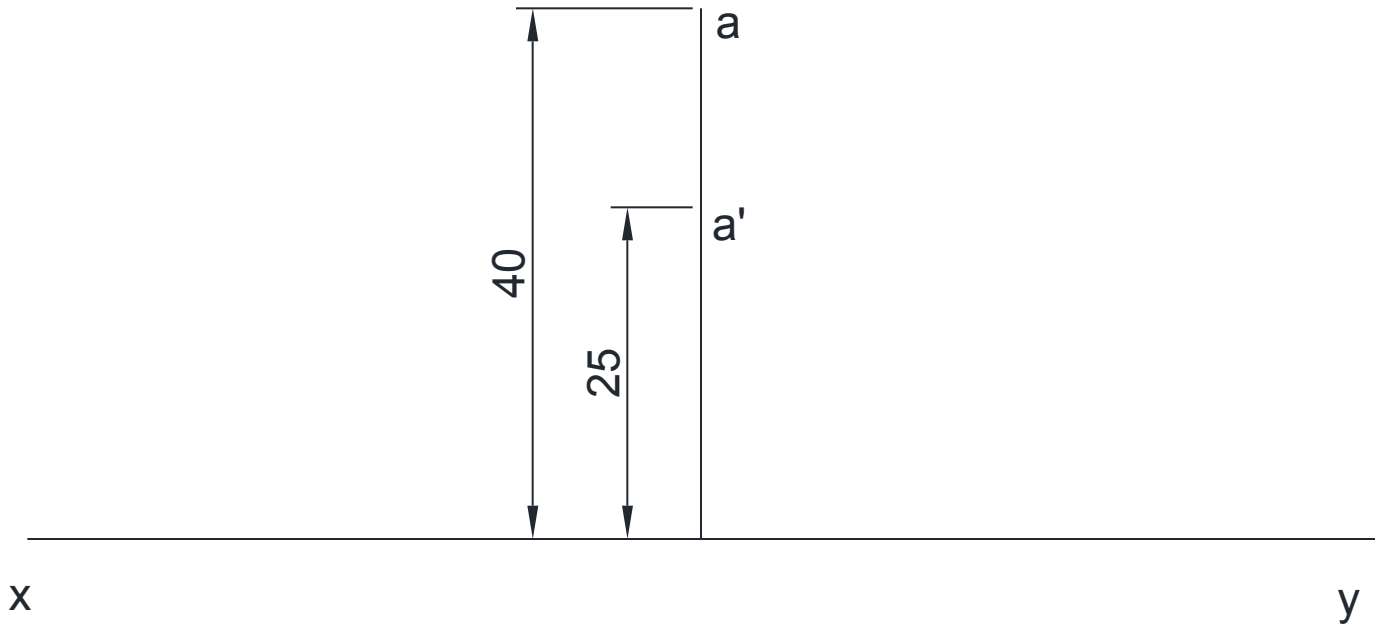
A point a is 25 mm above the HP and 30 mm in front of VP. Draw its projections.



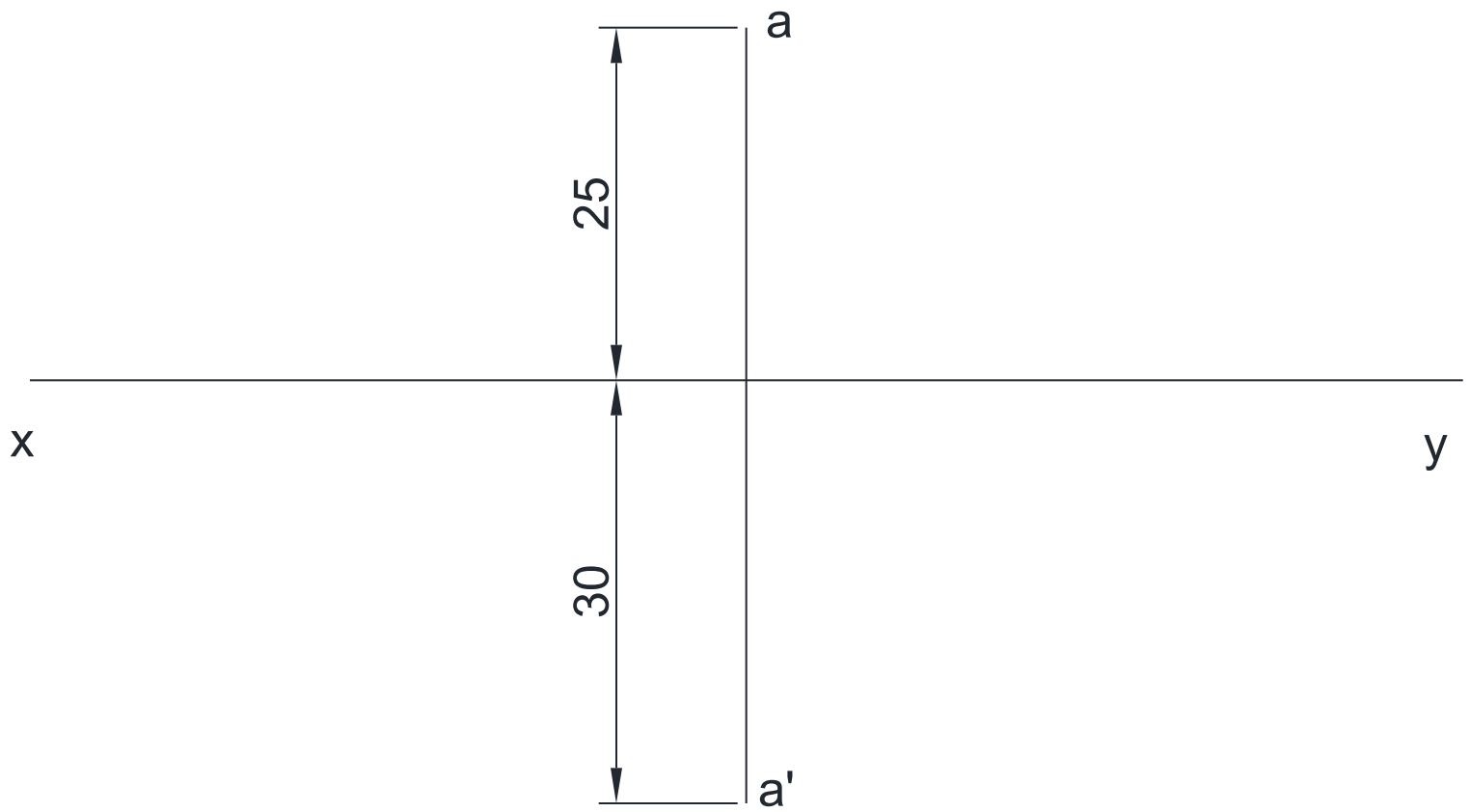
A point a is 40 mm above the HP and 25 mm in front of VP. Draw its projections.



A point a is 25 mm above the HP and 40 mm behind VP. Draw its projections.



A point a is 30 mm below the HP and 25 mm behind VP. Draw its projections.



A point a is 30 mm below the HP and 15 mm in front of VP. Draw its projections.