Concordia University
Engineering and Computer Science

MECH 211 – Mechanical Engineering Drawing

François Tardy

Credits: 3.5

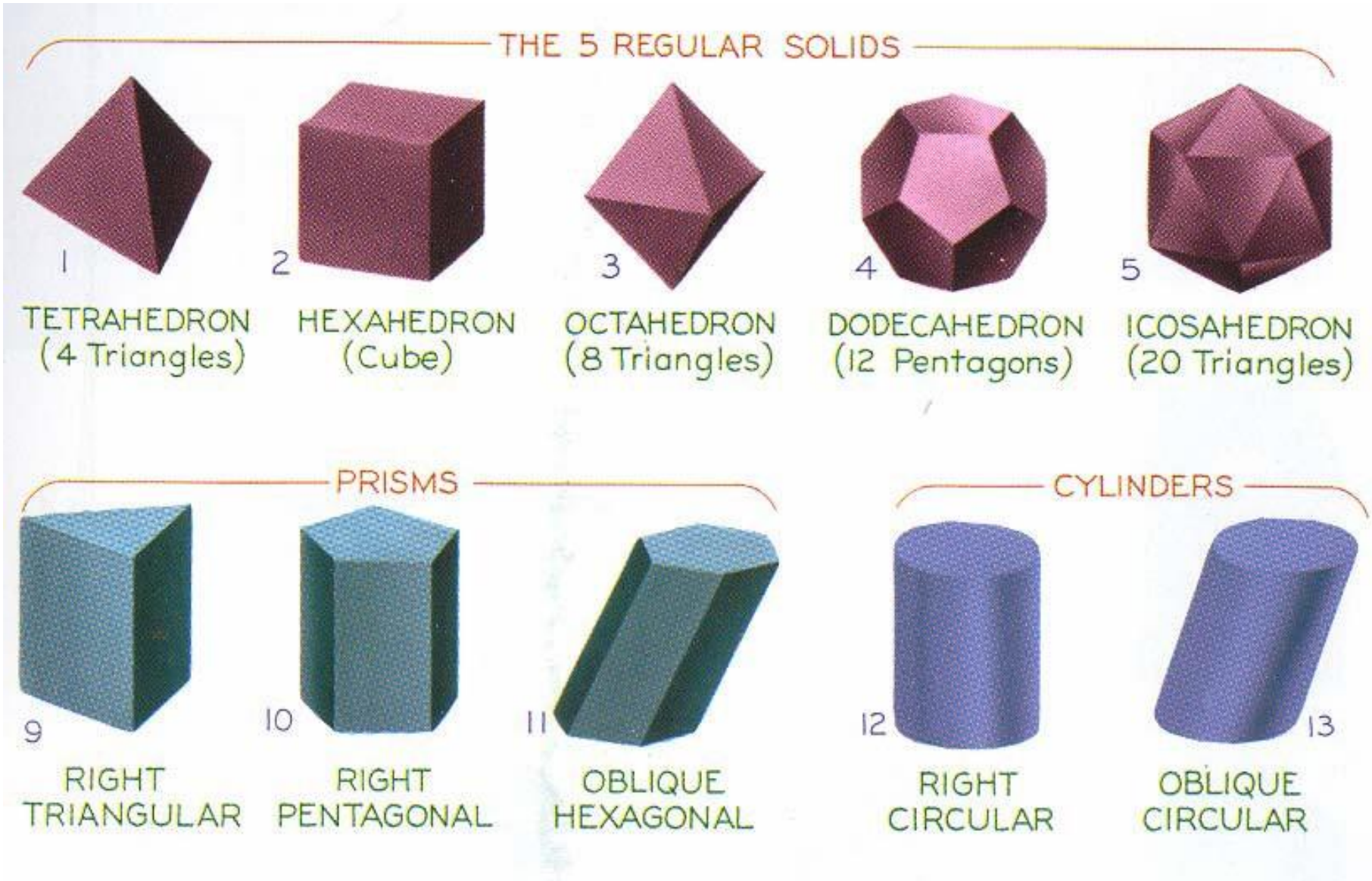
Lecture 7

Université Concordia University

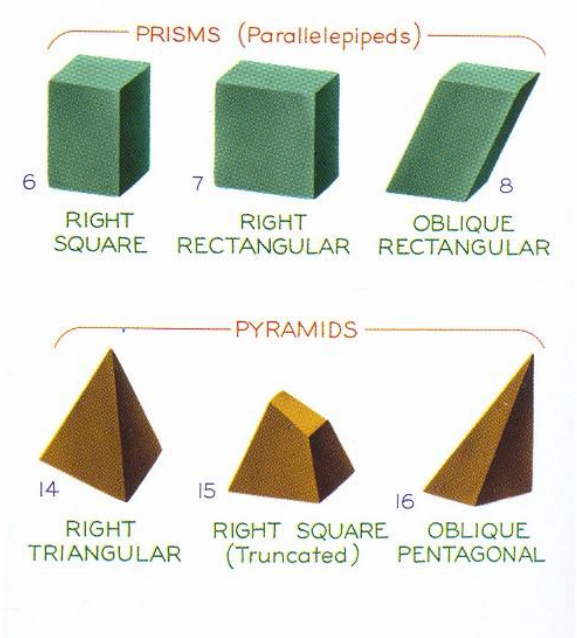
Content of the lecture

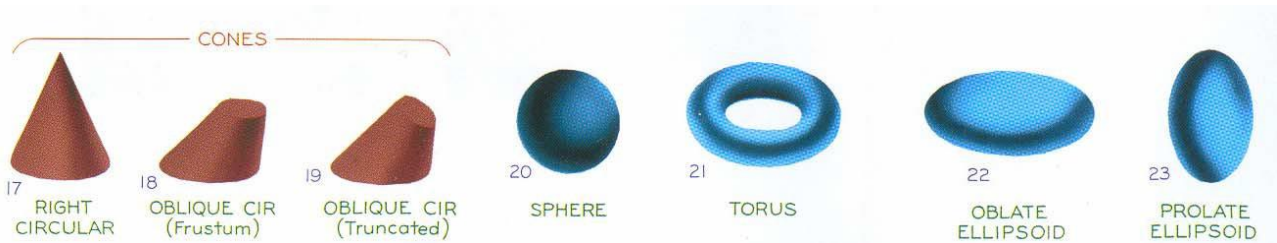
- Polyhedrons and curved surfaces – discussion
- Intersection of a plane with a polyhedron – visibility
- Intersection of a line with a polyhedron – visibility
- Location of a plane perpendicular to a line through a point
- Projection of a point to a plane
- Angle between a line and a plane – various methods
- Dihedral angle of two planes
- Intersection of a line with a cone
- Intersection of a cylinder with a plane
- Intersection of two prisms
- Intersection of two cylinders

Polyhedrons and curved surfaces



Polyhedrons and curved surfaces

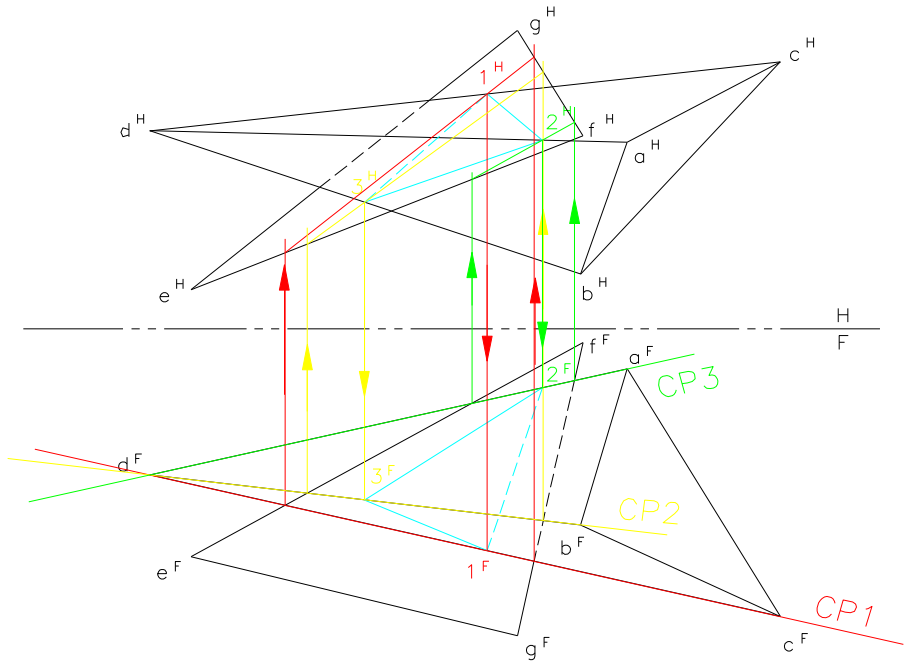




Intersection of plane and polyhedron

Cutting Plane Method

A INTERSECTION OF A PLANE AND A POLYHEDRON.
CUTTING PLANE METHOD.



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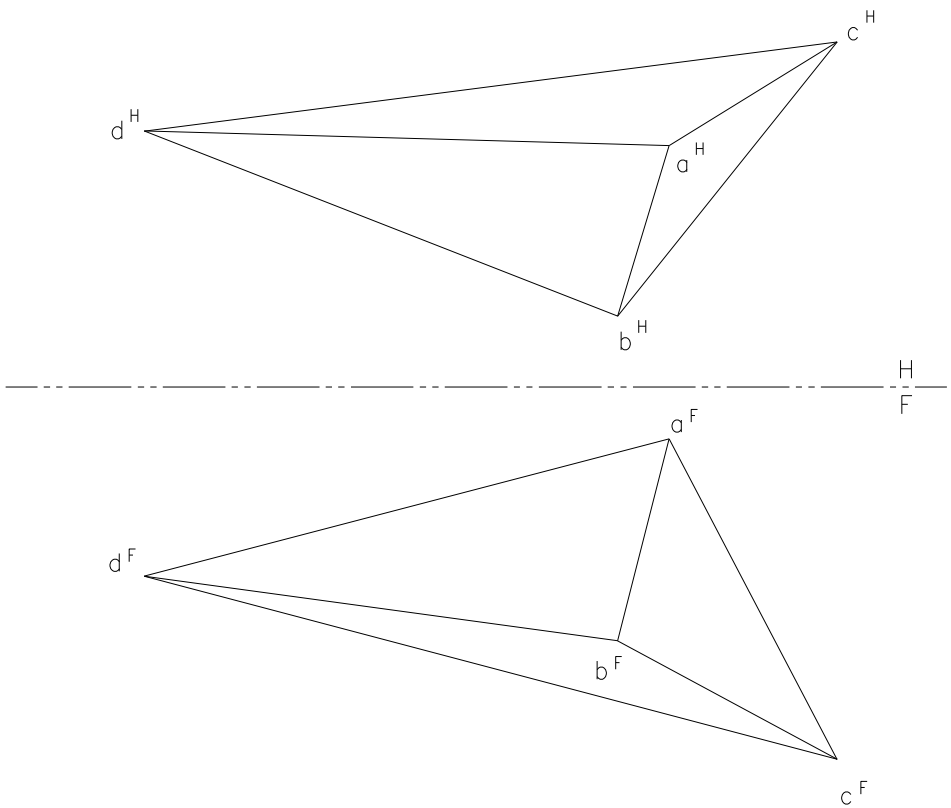
Intersection of plane and polyhedron

(A) INTERSECTION OF A PLANE AND A POLYHEDRON
CUTTING PLANE METHOD



abcd is the polyhedron

Intersection of plane and polyhedron

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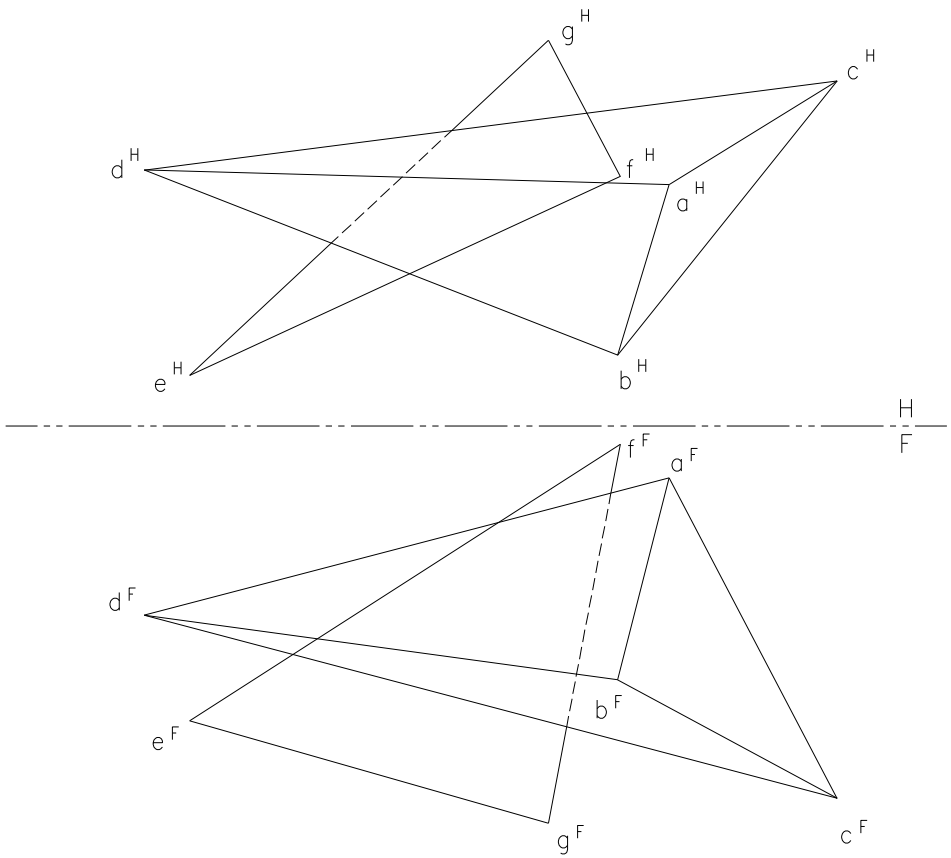

abcd is the polyhedron

efg is the plane that intersects the polyhedron abc

Intersection of plane and polyhedron

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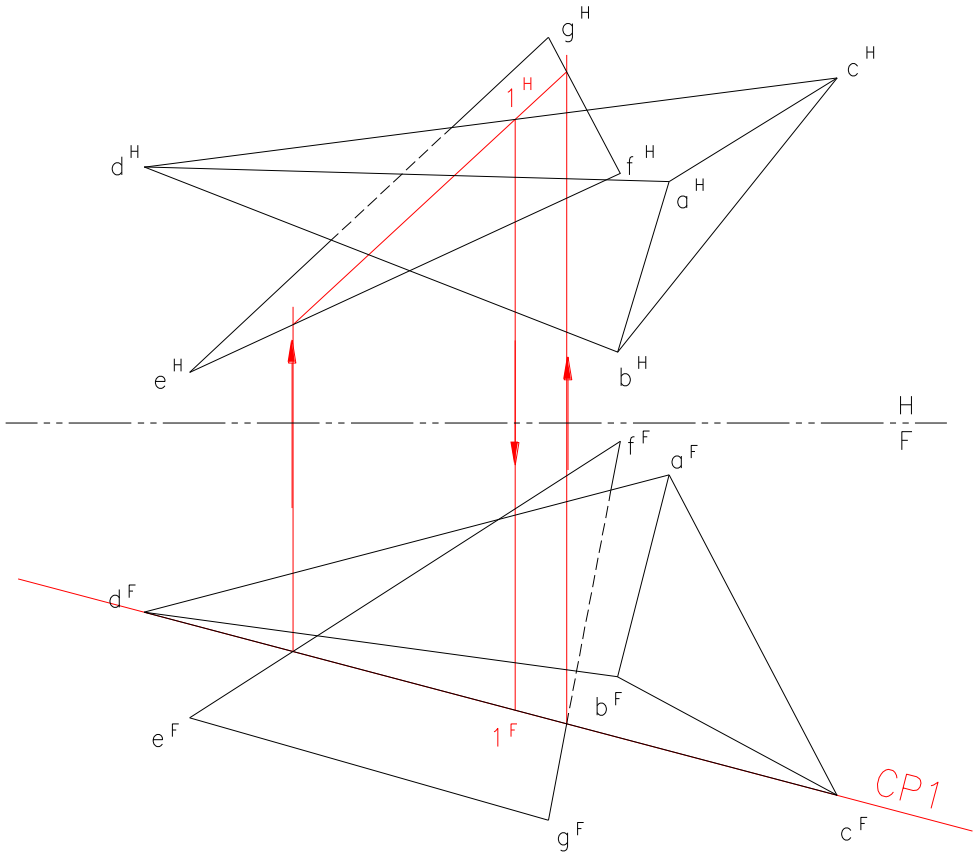


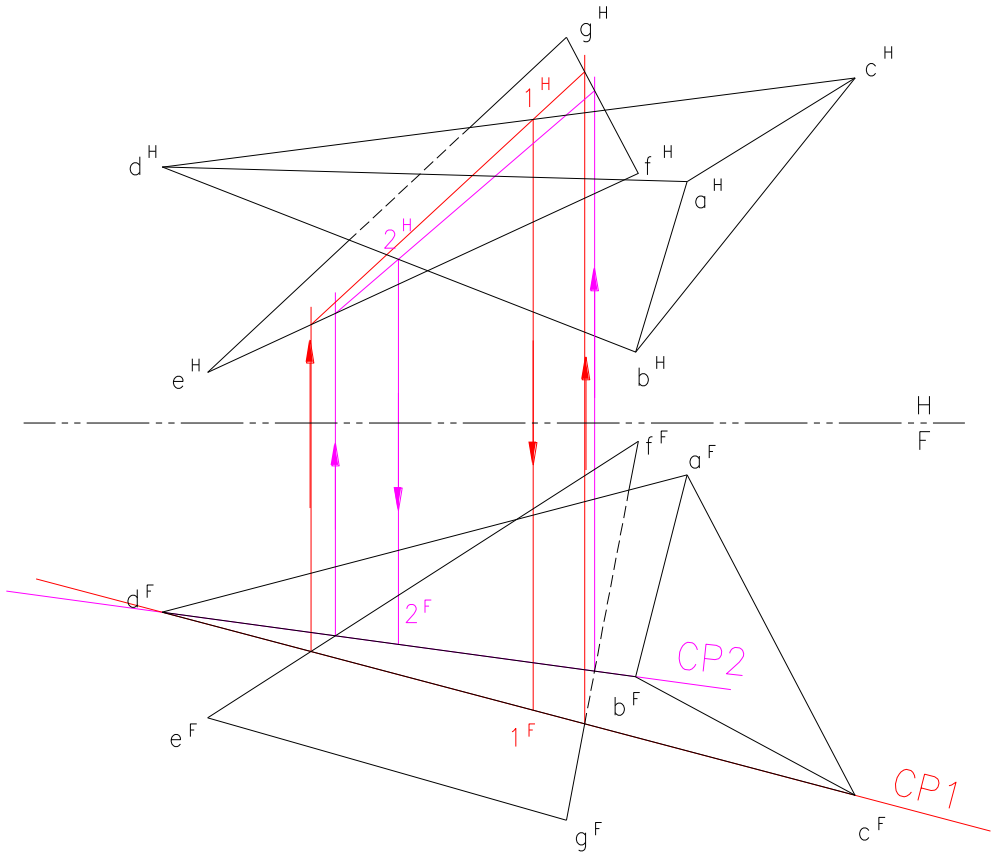
abcd is the polyhedron

efg is the plane that intersects the polyhedron abc

CP1 is the cutting plane whose EV coincides with line cd of the polyhedron in the FV.
project the points of intersctions on to the TV and find the piercing point 1

Intersection of plane and polyhedron

A INTERSECTION OF A PLANE AND A POLYHEDRON.
CUTTING PLANE METHOD.



abcd is the polyhedron

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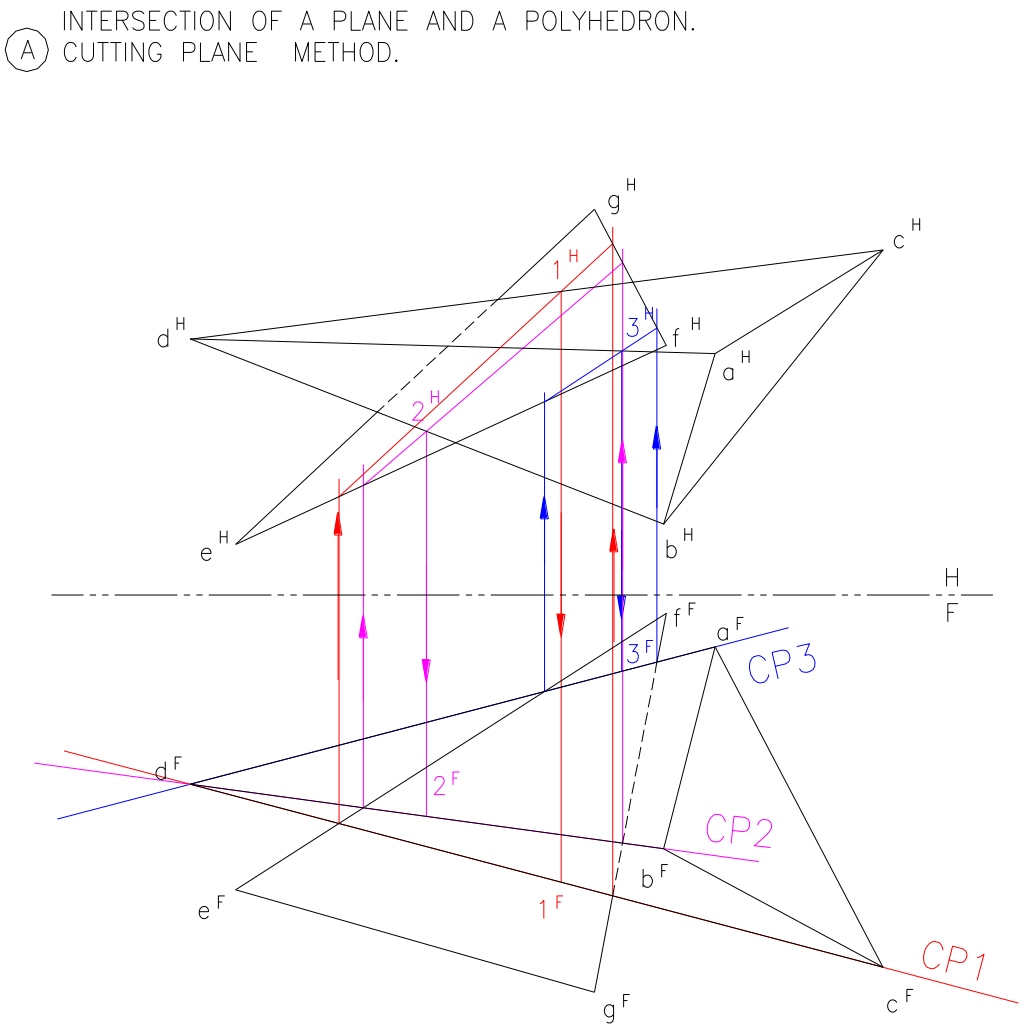
CP1 is the cutting plane whose EV coincides with line cd of the polyhedron in the FV.
project the points of intersctions on to the TV and find the piercing point 1

CP2 is the cutting plane whose EV coincides with line db of the polyhedron in the FV.
project the points of intersctions on to the TV and find the piercing point 2

Intersection of plane and polyhedron



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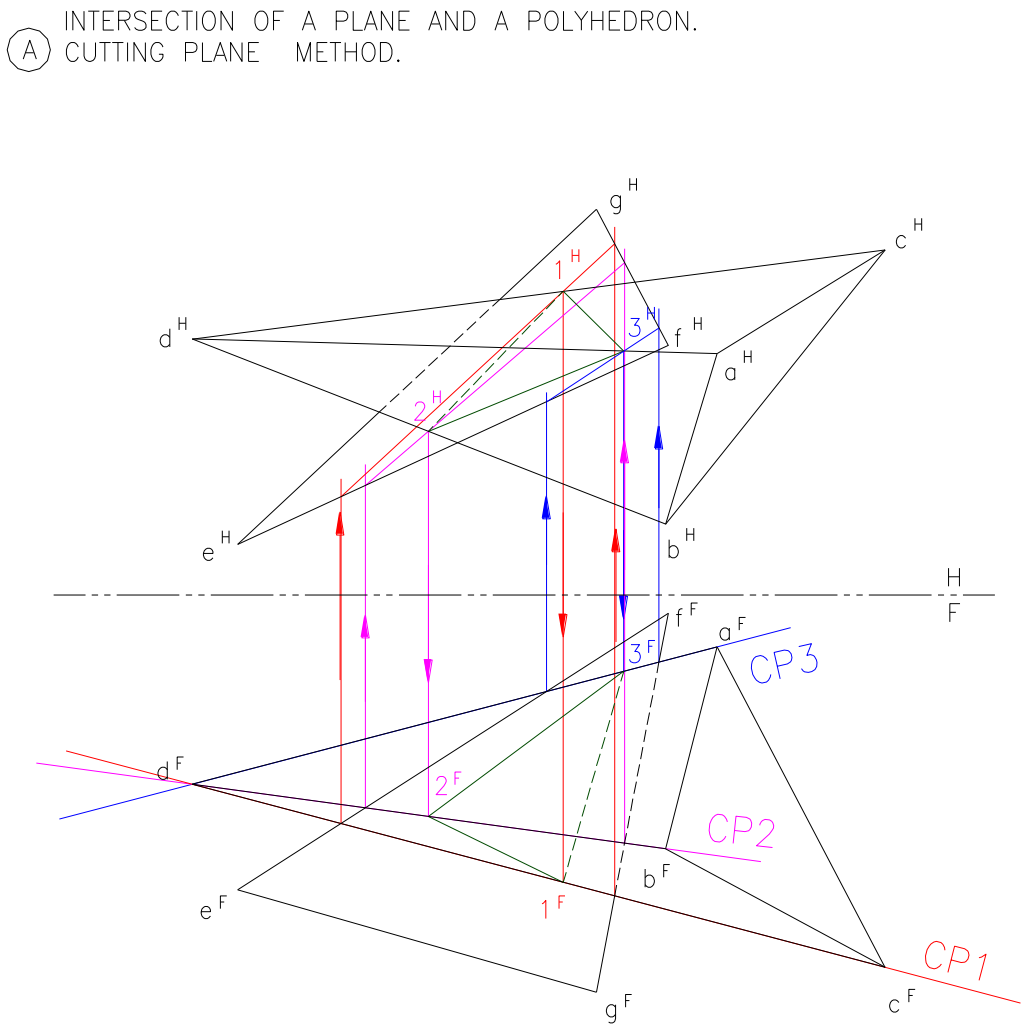
CP2 is the cutting plane whose EV coincides with line db of the polyhedron in the FV.
project the points of intersctions on to the TV and find the piercing point 2

CP3 is the cutting plane whose EV coincides with line da of the polyhedron in the FV.
project the points of intersctions on to the TV and find the piercing point 3

Intersection of plane and polyhedron



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CP1 is the cutting plane whose EV coincides with line cd of the polyhedron in the FV.
project the points of intersctions on to the TV and find the piercing point 1

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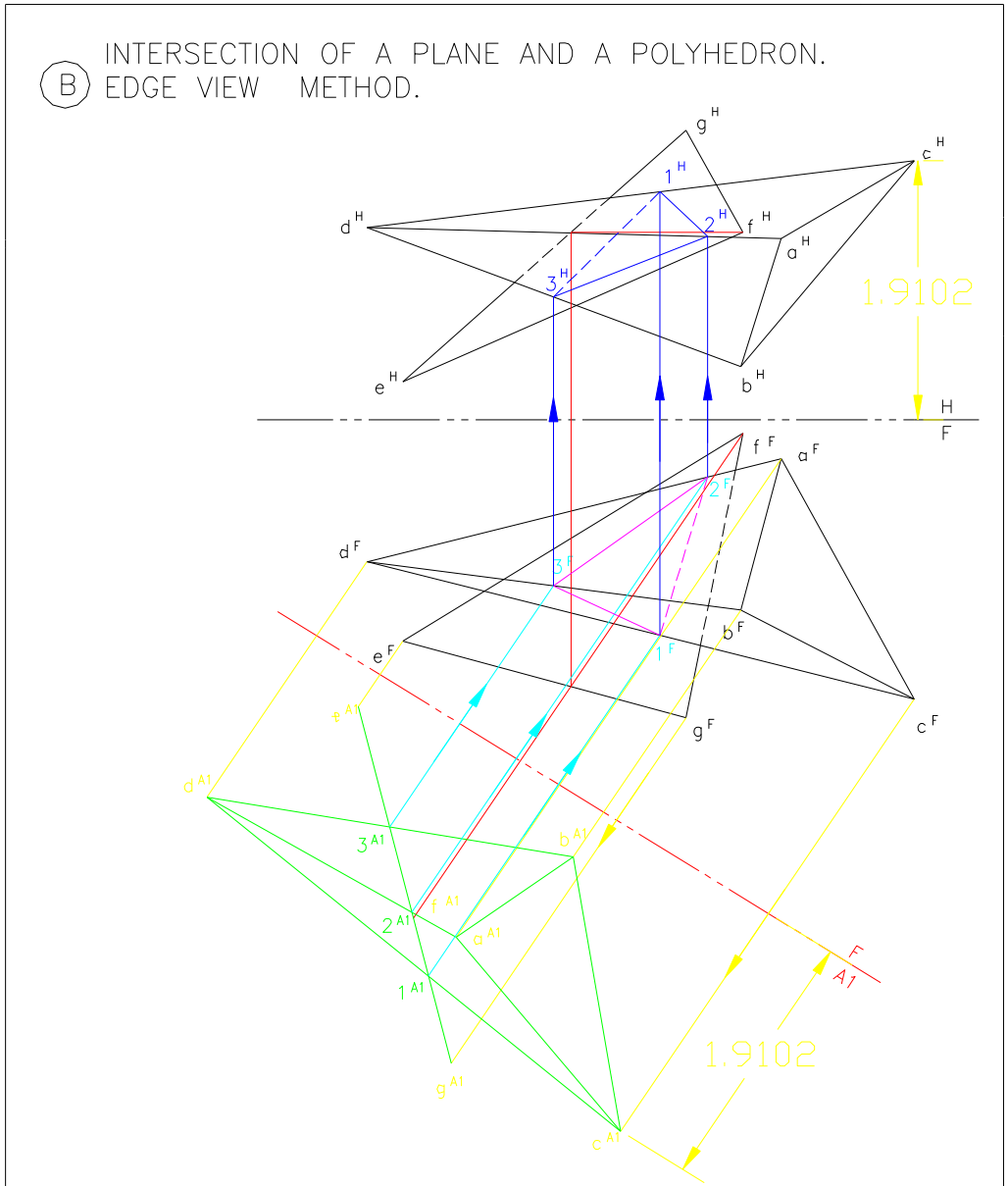
project the points of intersctions on to the TV and find the piercing point 2

CP3 is the cutting plane whose EV coincides with line da of the polyhedron in the FV.
project the points of intersctions on to the TV and find the piercing point 3

Connect points 1, 2, 3 to get the intersection between the plane efg and the polyhedron abcd

Intersection of plane and polyhedron

Edge View Method



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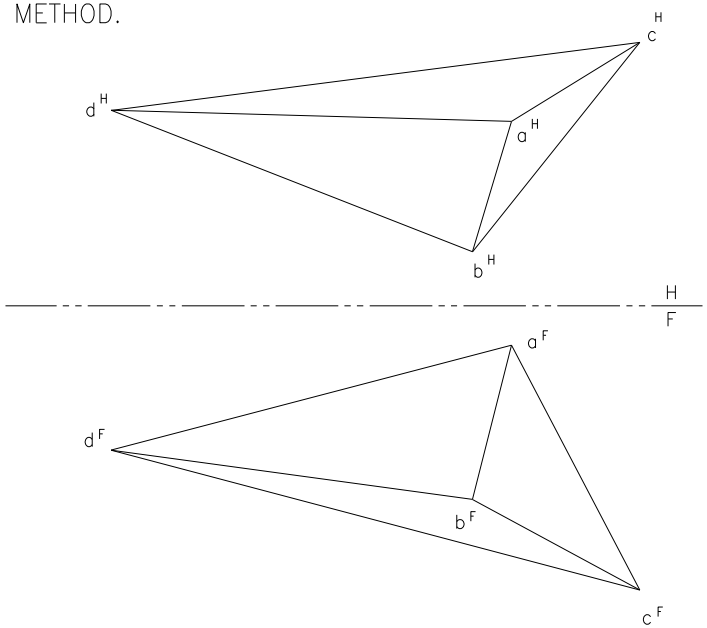
Intersection of plane and polyhedron

(B) INTERSECTION OF A PLANE AND A POLYHEDRON.
EDGE VIEW METHOD.



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Intersection of plane and polyhedron

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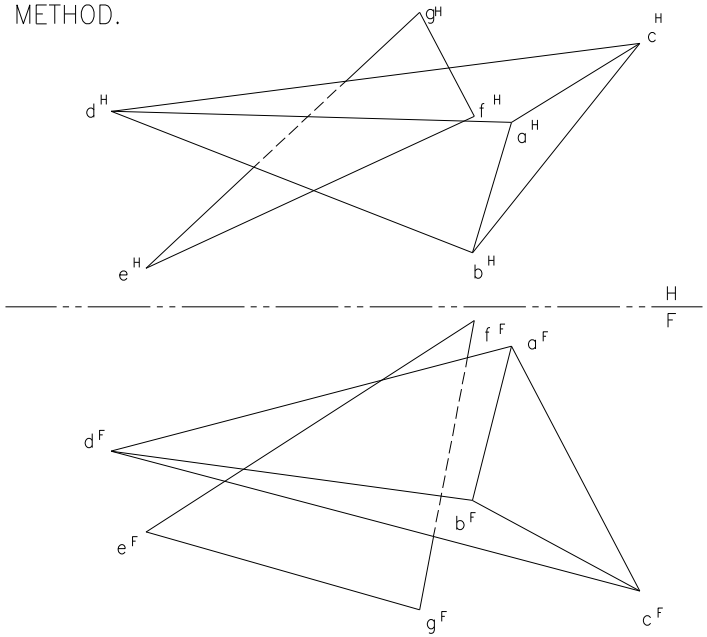

abcd is the polyhedron

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Intersection of plane and polyhedron

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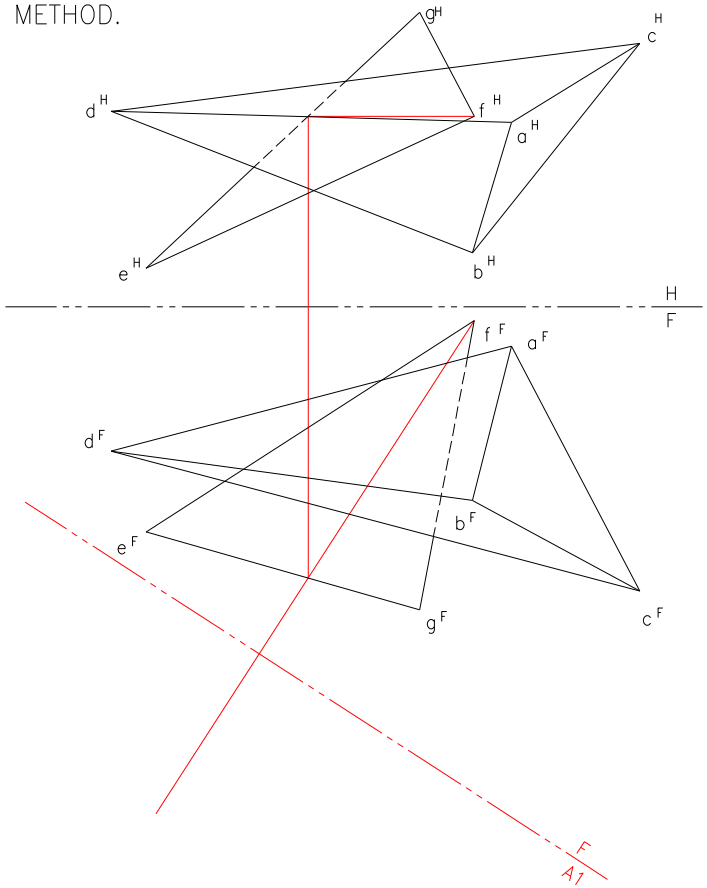
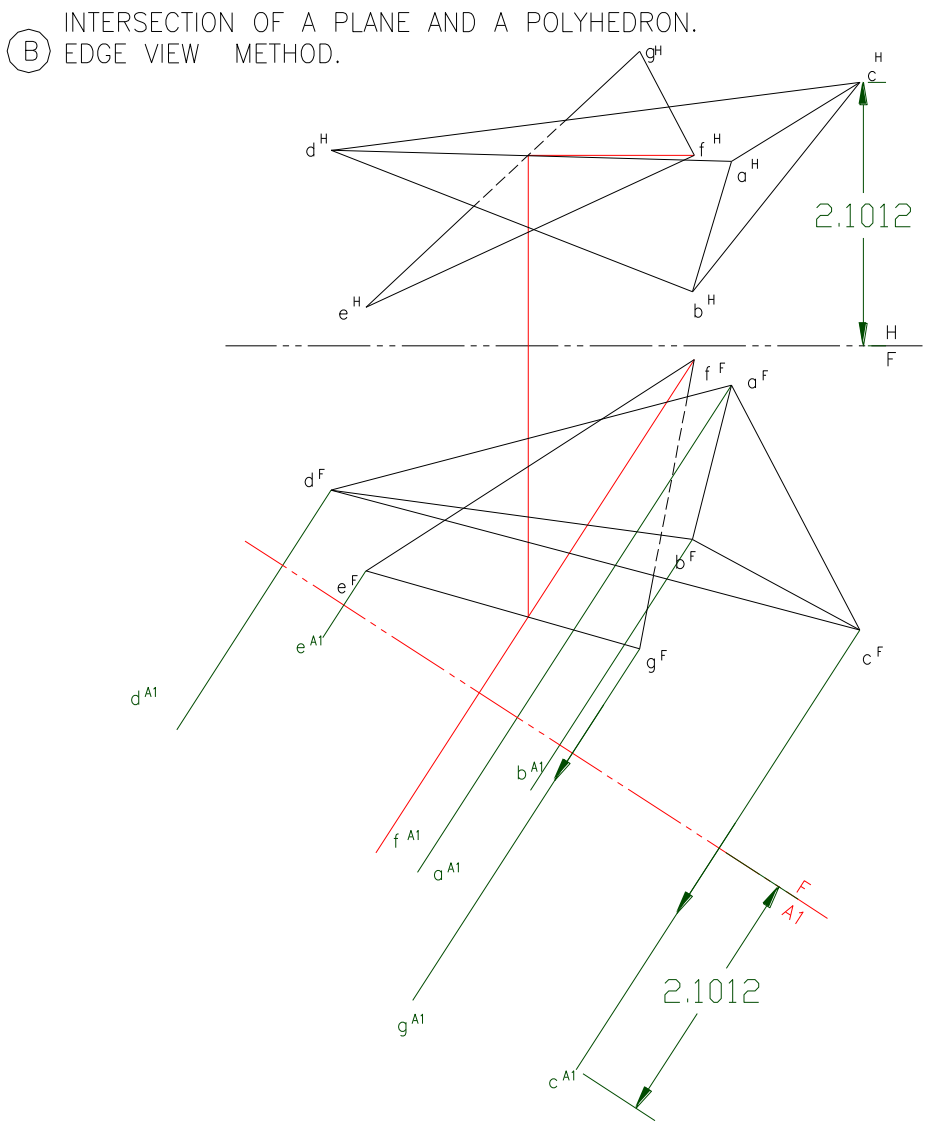


abcd is the polyhedron

efg is the plane that intersects the polyhedrong abcd

In the EV method, draw the EV of the plane

Intersection of plane and polyhedron



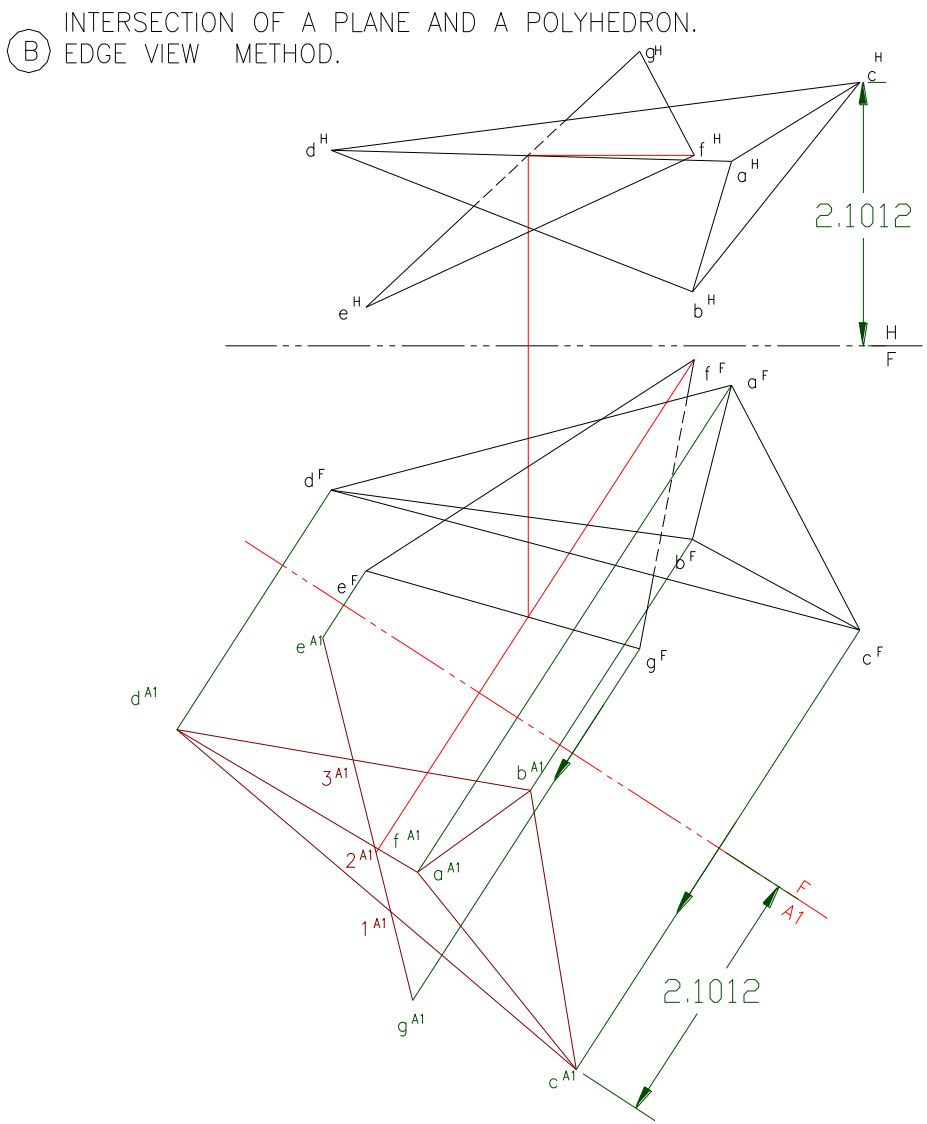
abcd is the polyhedron

efg is the plane that intersects the polyhedrong abcd

In the EV method, draw the EV of the plane

Project the points abcdefg, parallel to the TL line in the plane

Intersection of plane and polyhedron



abcd is the polyhedron

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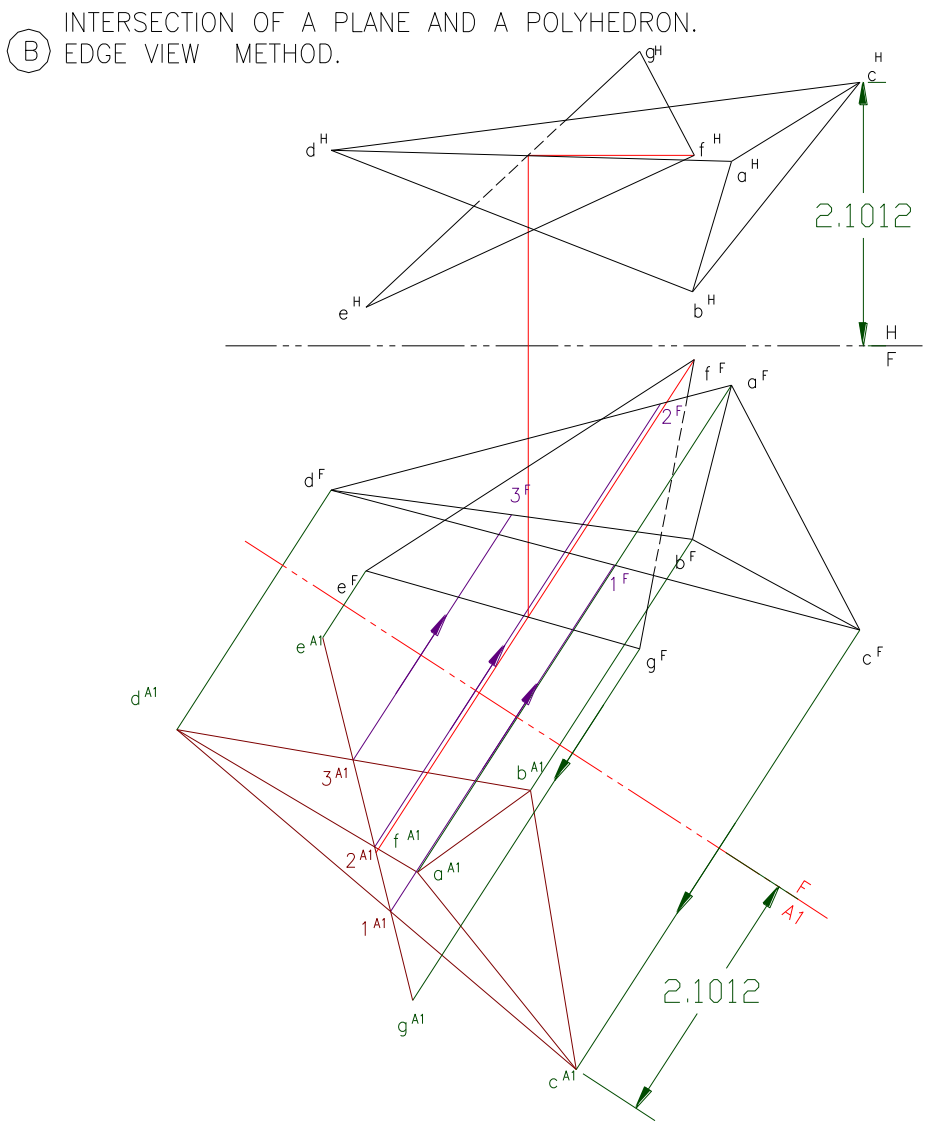
In the EV method, draw the EV of the plane

Project the points abcdefg, parallel to the TL line in the plane

Complete the polyhedron in that view and the EV of the plane efg. Here you can find the piercing points 1 2 and 3

Intersection of plane and polyhedron



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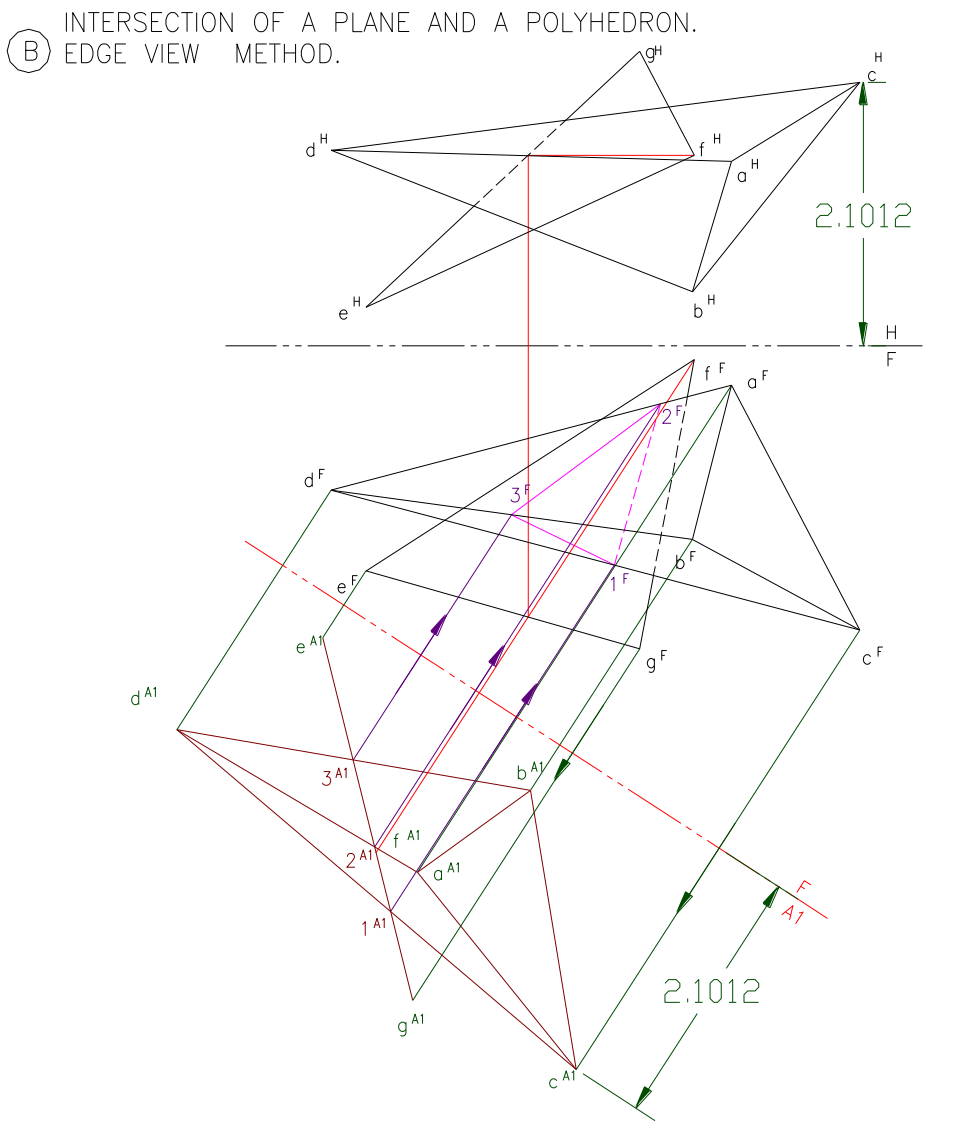
Project the points abcdefg, parallel to the TL line in the plane

Complete the polyhedron in that view and the EV of the plane efg. Here you can find the piercing points 1 2 and 3

Project the piercing points 1, 2, 3 back to the FV from the aux view based on the edges in the polyhedron

Intersection of plane and polyhedron



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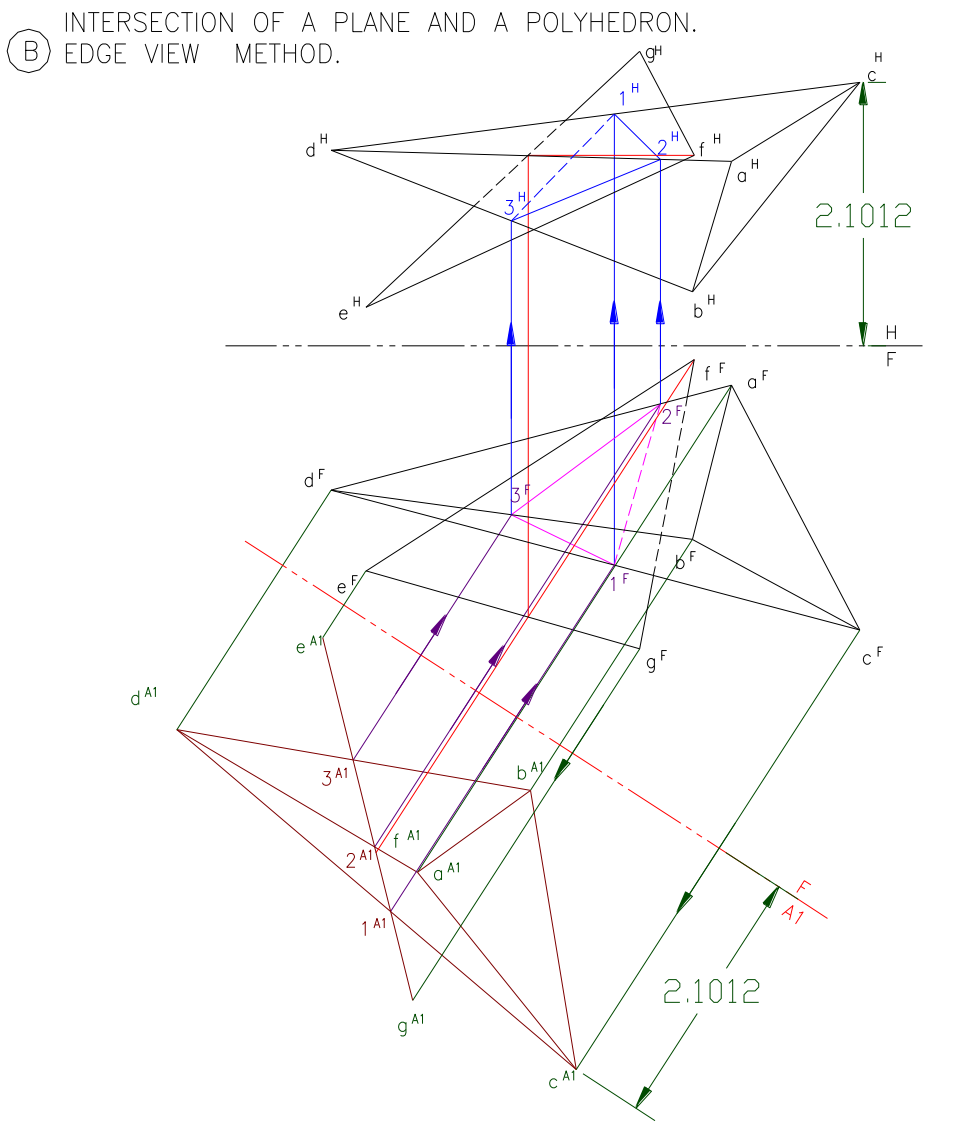
Project the piercing points 1, 2, 3 back to the FV from the aux view based on the edges in the polyhedron

Join the points 1, 2, 3 in propoer order to get the plane of intersection in the FV

Intersection of plane and polyhedron



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In the EV method, draw the EV of the plane

Project the points abcdefg, parallel to the TL line in the plane

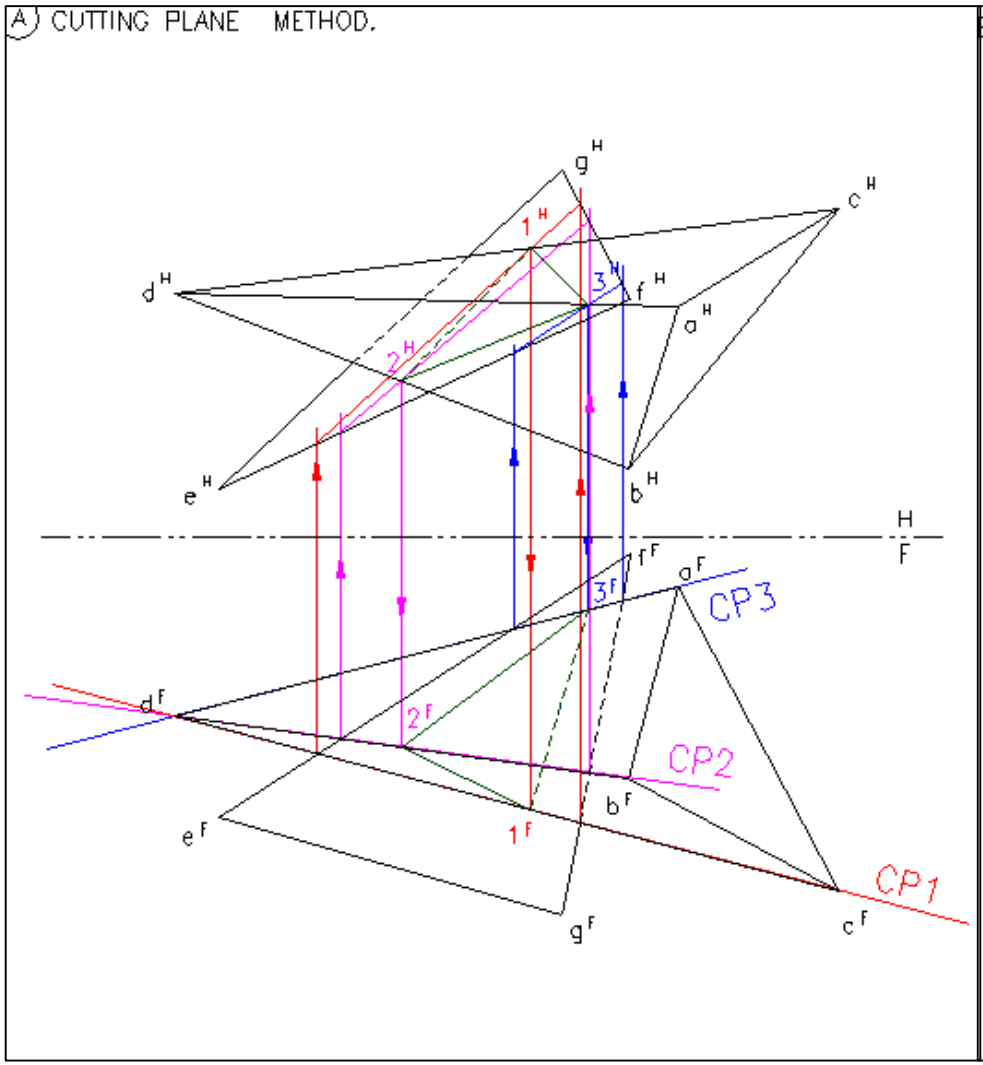
Complete the polyhedron in that view and the EV of the plane efg. Here you can find the piercing points 1 2 and 3

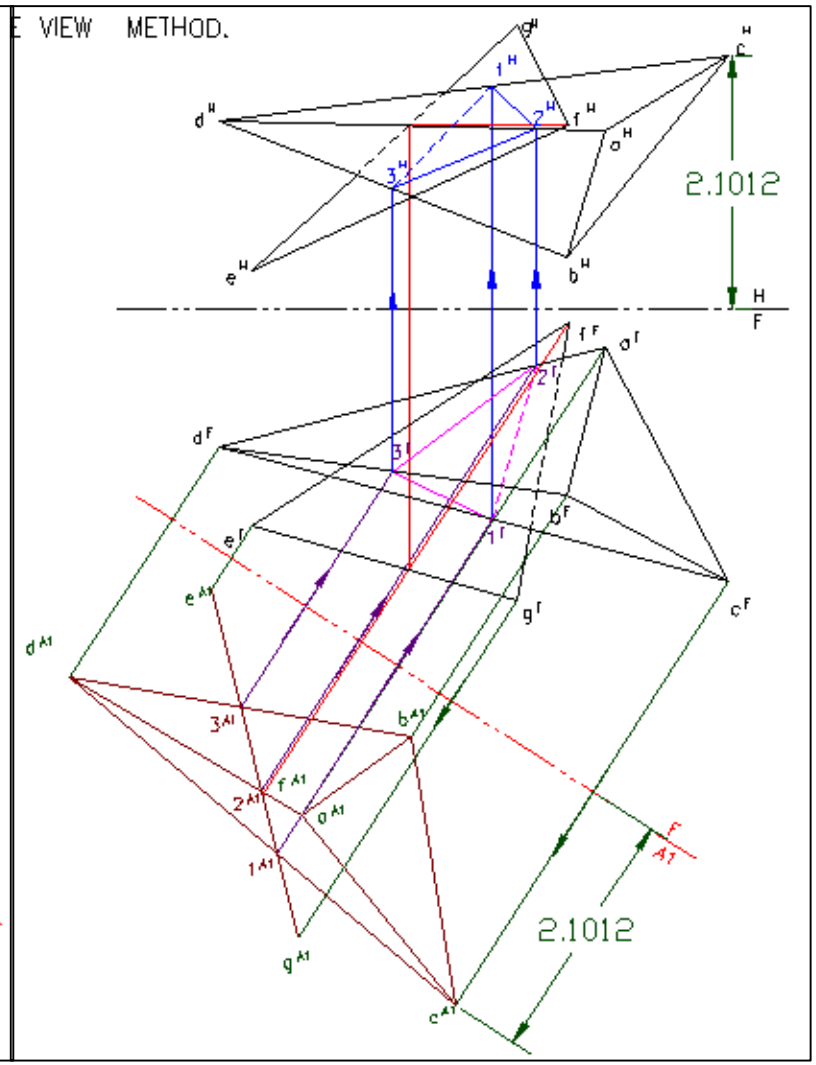
Project the piercing points 1, 2, 3 back to the FV from the aux view based on the edges in the polyhedron

Join the points 1, 2, 3 in propoer order to get the plane of intersection in the FV

Project the points from the FV to the TV and complete the plane in the TV as well

Intersection of plane and polyhedron





Intersection of line with polyhedron

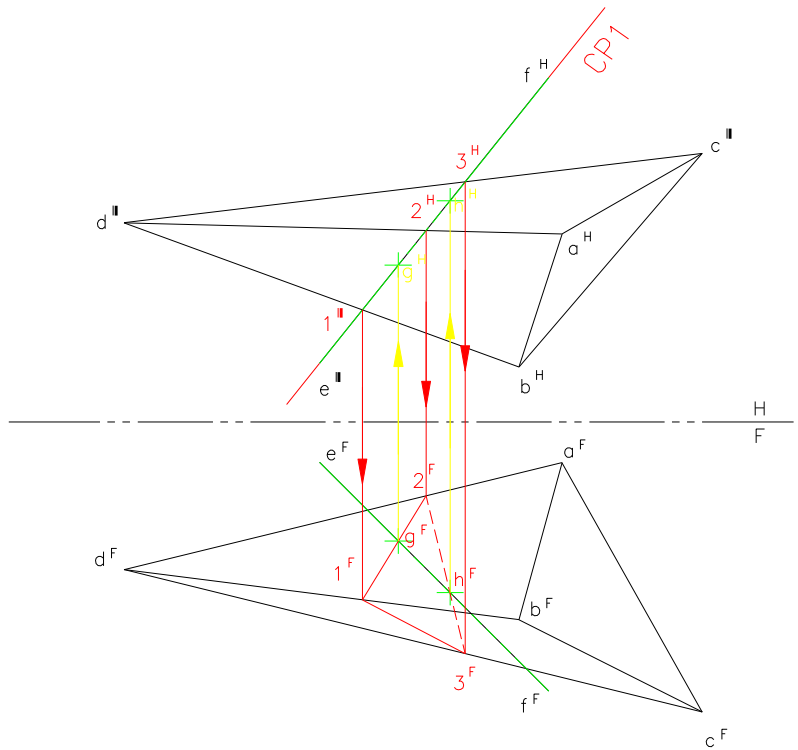
Cutting Plane Method

Ⓐ INTERSECTION OF A LINE AND A POLYHEDRON.
CUTTING PLANE METHOD.

A line must intersect the surface of a polyhedron at two points.
An plane containing the given line will help us determine the two points of intersection.

To simplify the solution we will use a plane that appears as an edge in one of the views (CP1).

To see the line in the correct visibility with the points of intersection with the polyhedron marked by crosses turn off layer A1OFF and turn on layer A4.



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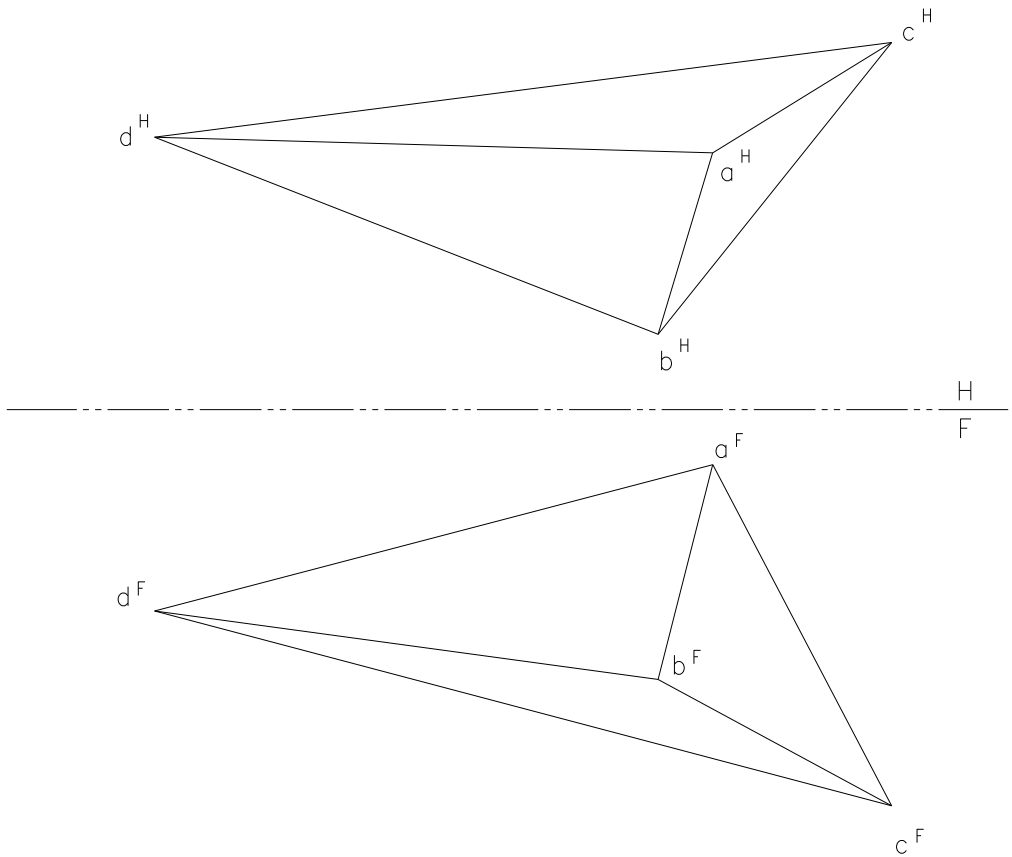
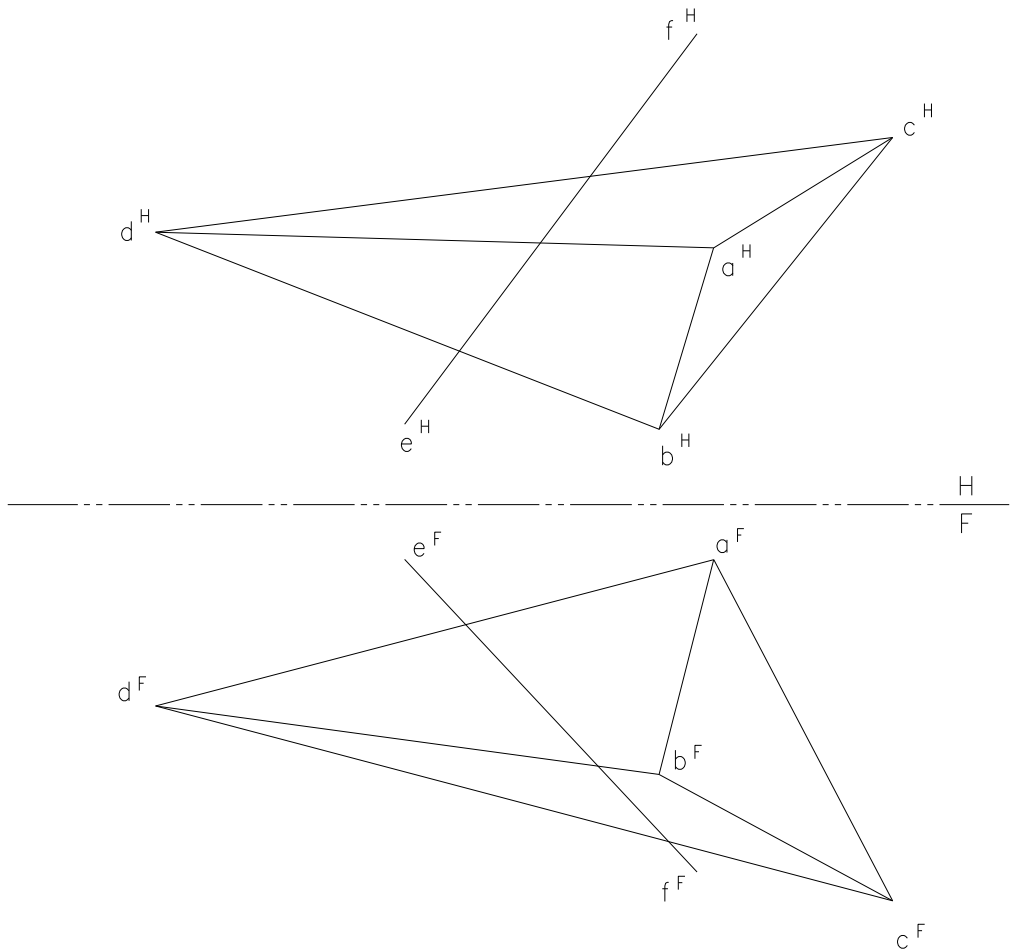
Intersection of line with polyhedron



abcd is the polyhedron

Intersection of line with polyhedron

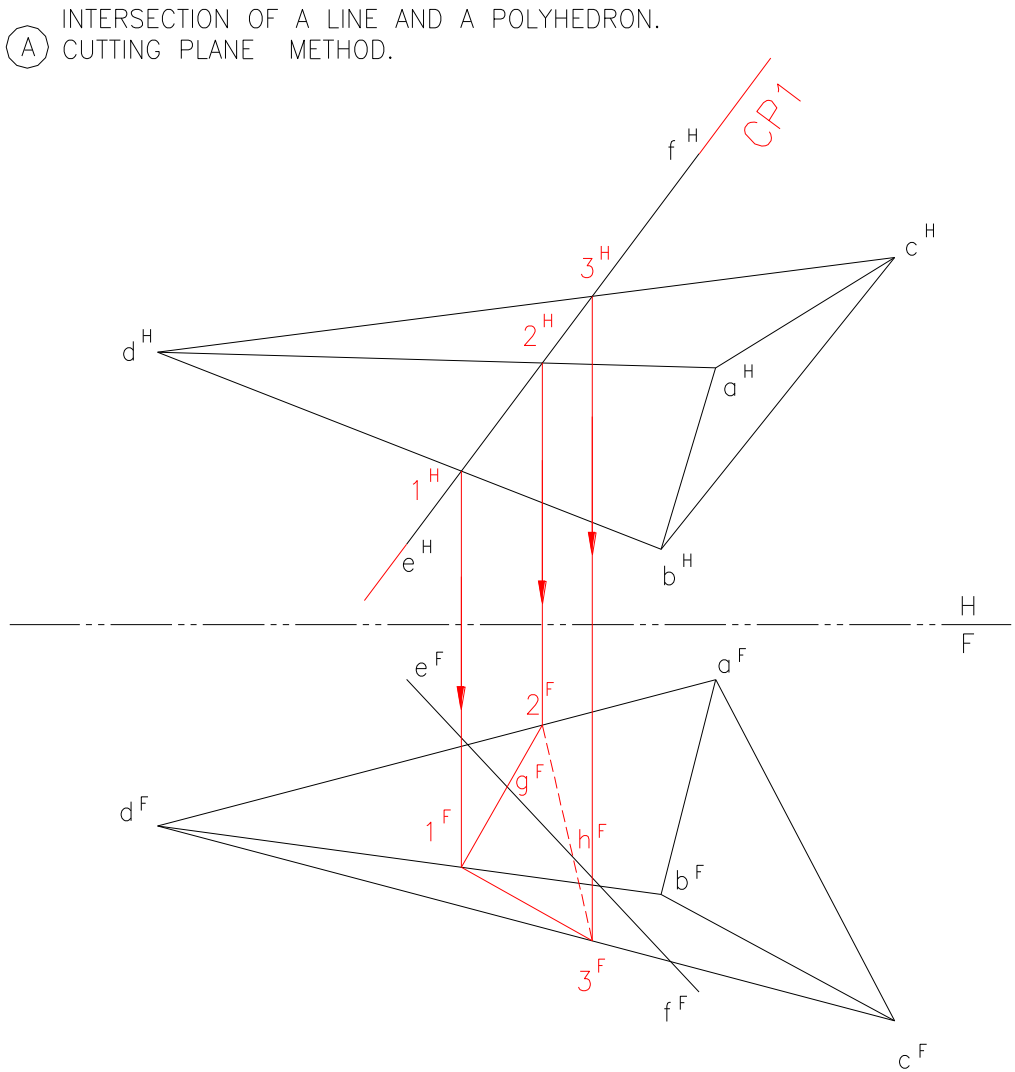
(A) INTERSECTION OF A LINE AND A POLYHEDRON.
CUTTING PLANE METHOD.



abcd is the polyhedron

ef is the line intersecting the polyhedron abcd. A line must intersect the surface of a polyhedron at two points.
An plane containing the given line will help us determine the two points of intersection.

Intersection of line with polyhedron



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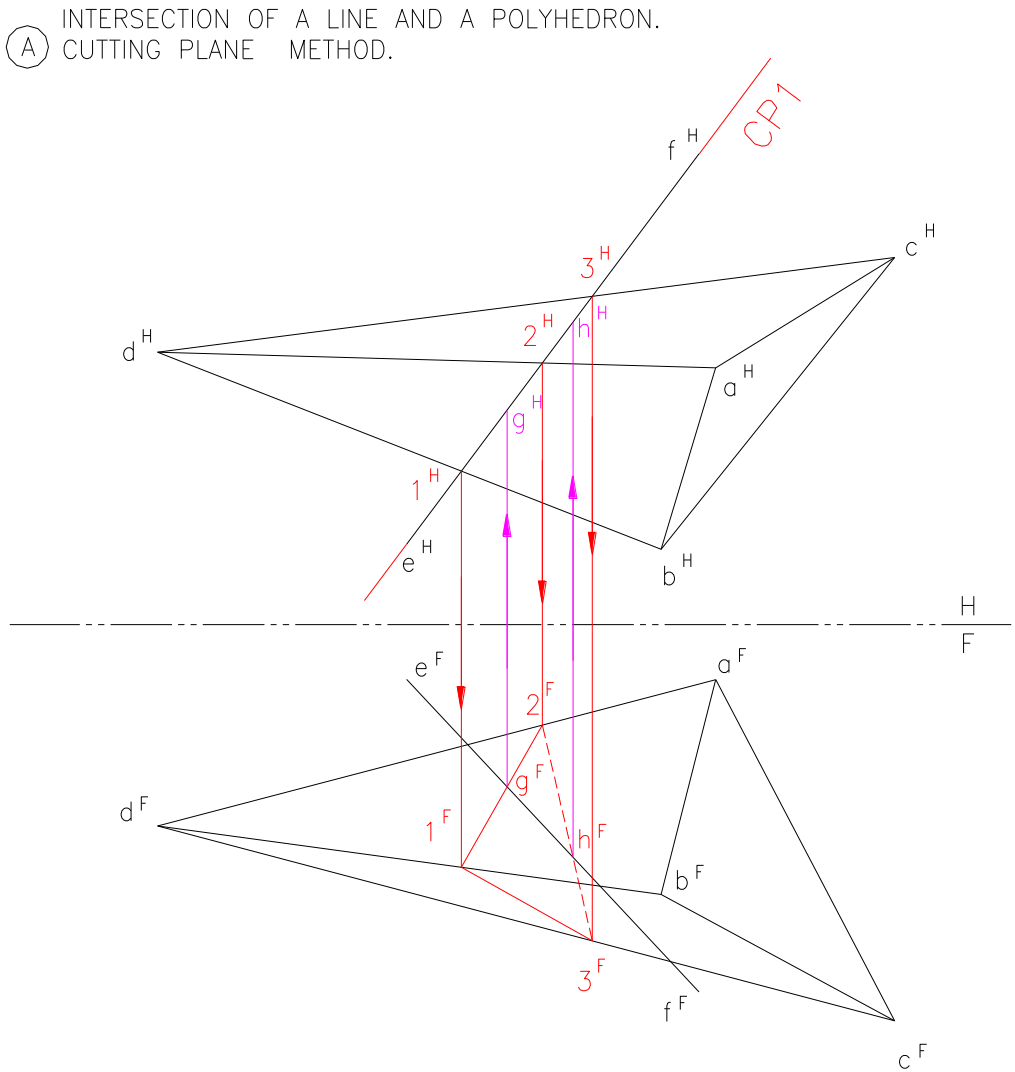
To simplify the solution we will use a plane that appears as an edge in one of the views (CP1). Project the points where line intersects the edges of the polyhedron to the TV. This will give the plane of intersection 123

Intersection of line with polyhedron



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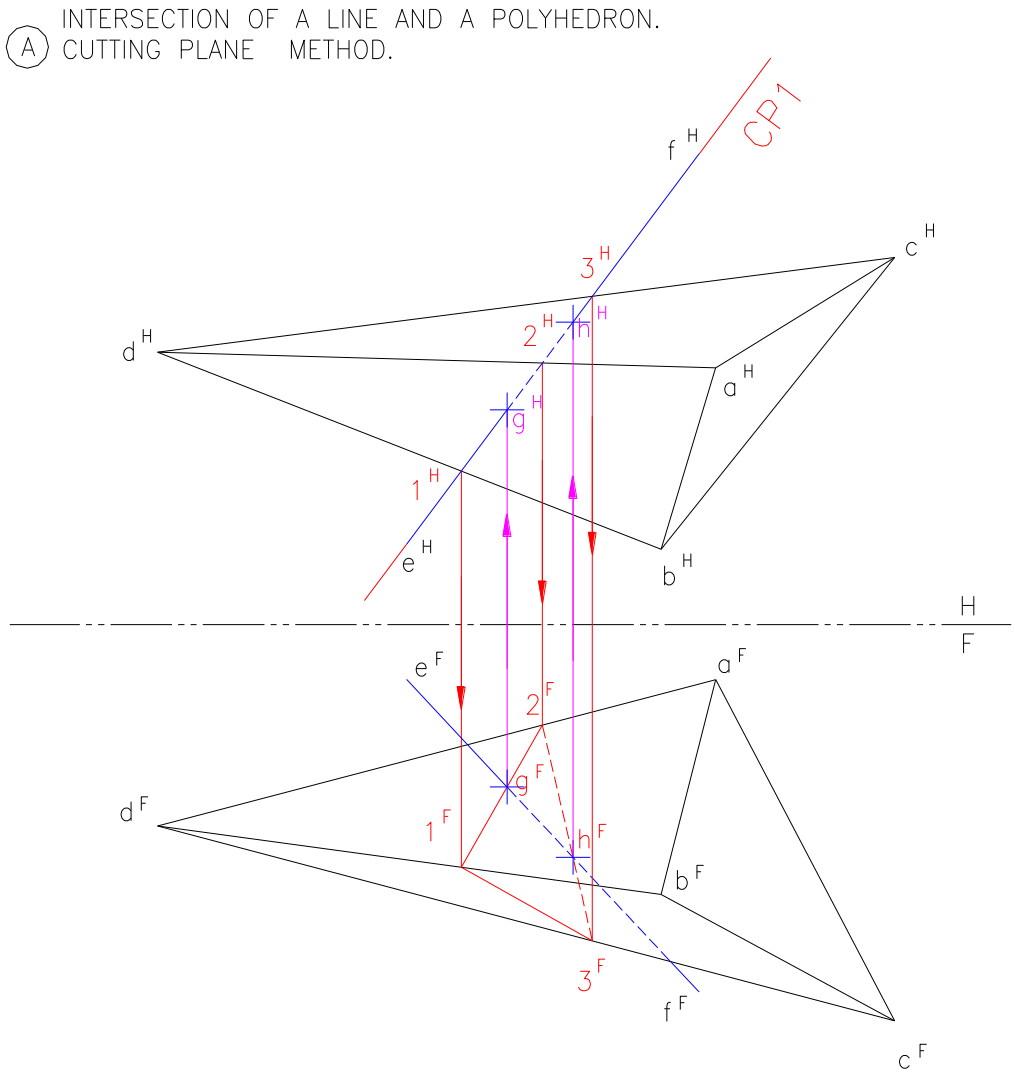
The line of intersection should be within this plane. So mark the piercing poings g and h where the line intersects the plane 123.

Project the points to the TV. This will give the line of intersection between polygon abcd and line ef.

Intersection of line with polyhedron



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An plane containing the given line will help us determine the two points of intersection.

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The line of intersection should be within this plane. So mark the piercing poings g and h where the line intersects the plane 123.

Project the points to the TV. This will give the line of intersection between polygon abcd and line ef.

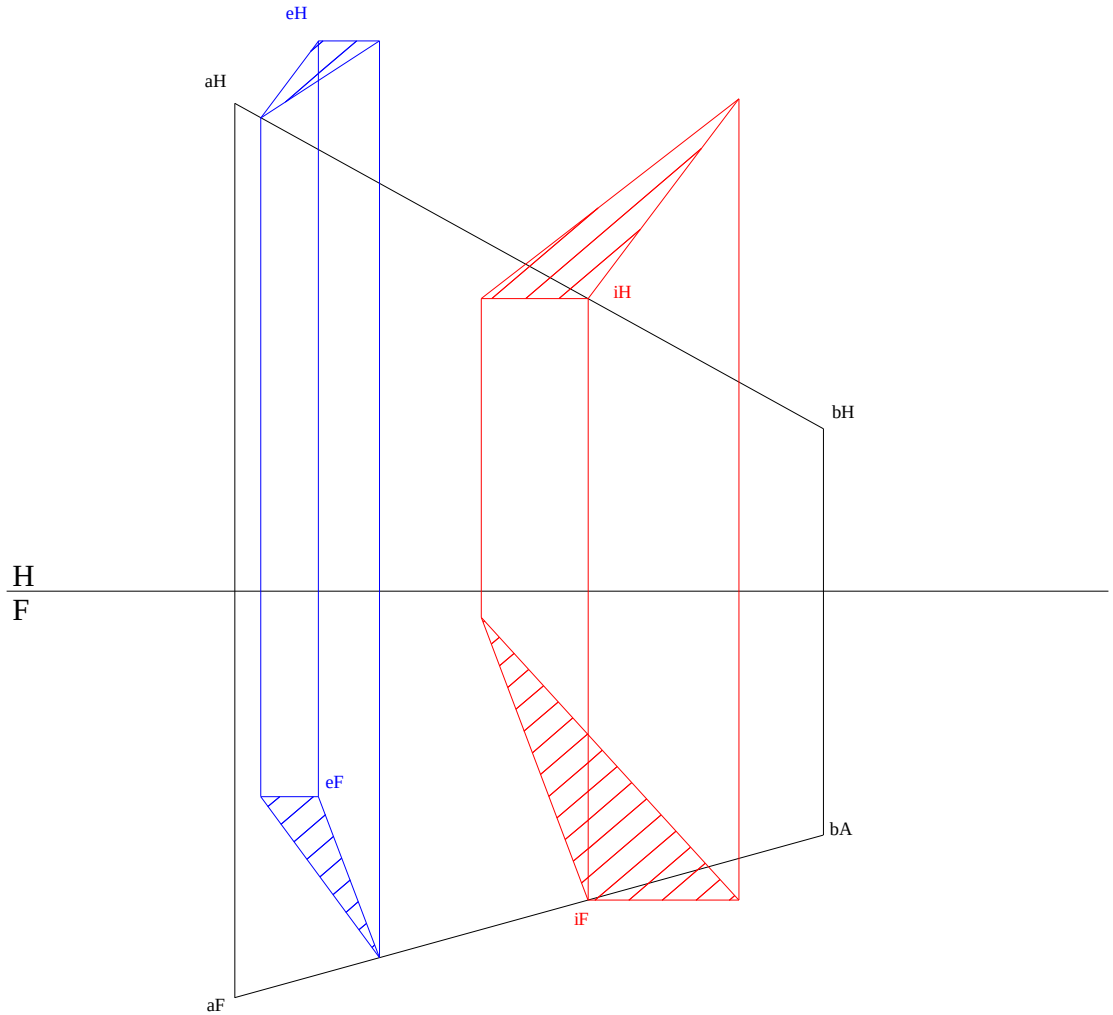
To see the line in the correct visibility with the points of intersection with the polyhedron marked by crosses turn off layer A1OFF and turn on layer A4.

Location of a plane

perpendicular to a line through a point

Through points I and E respectively draw planes that are perpendicular to line AB.

I belongs to AB. E does not belong to AB.



Location of a Plane

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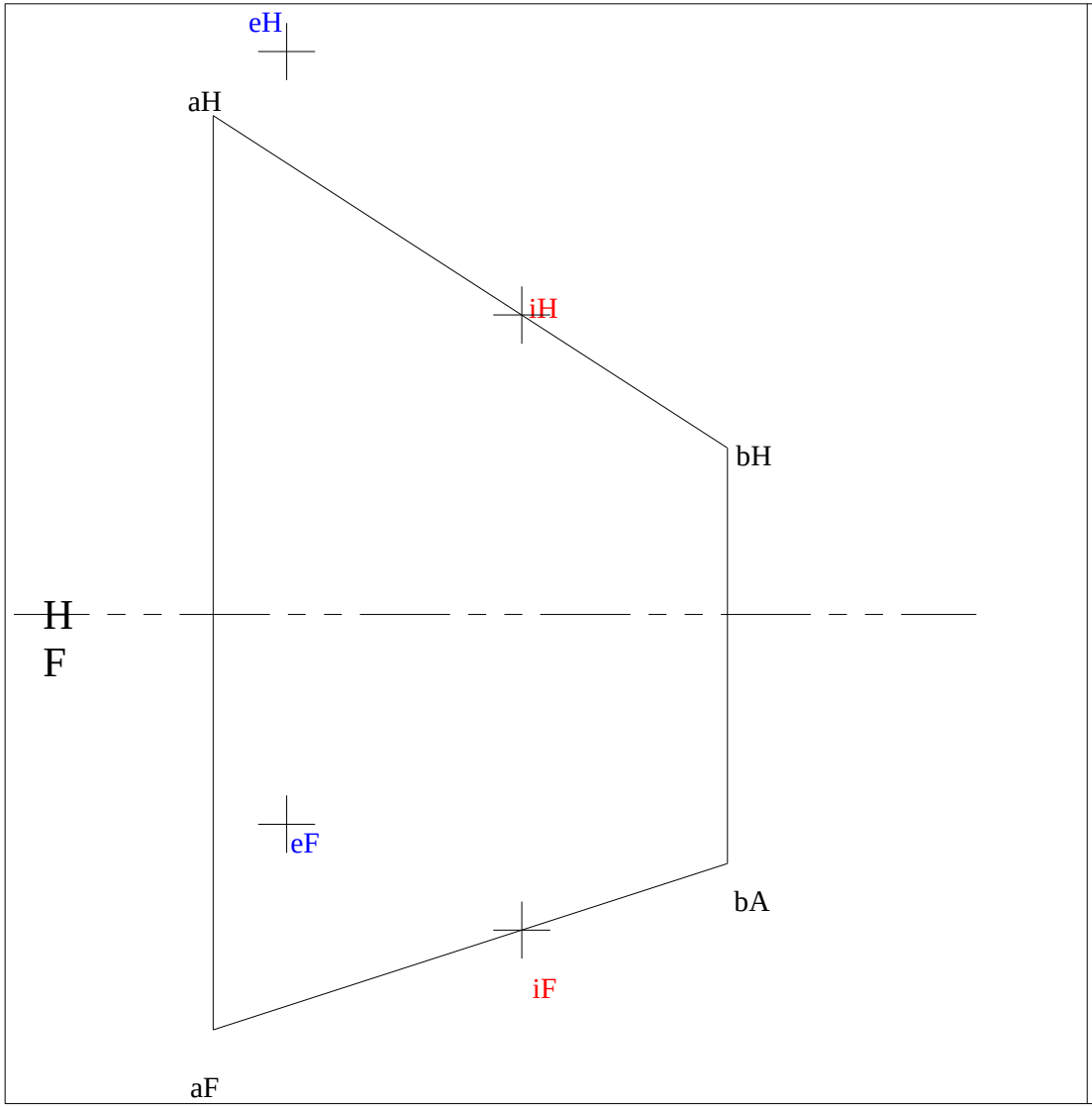
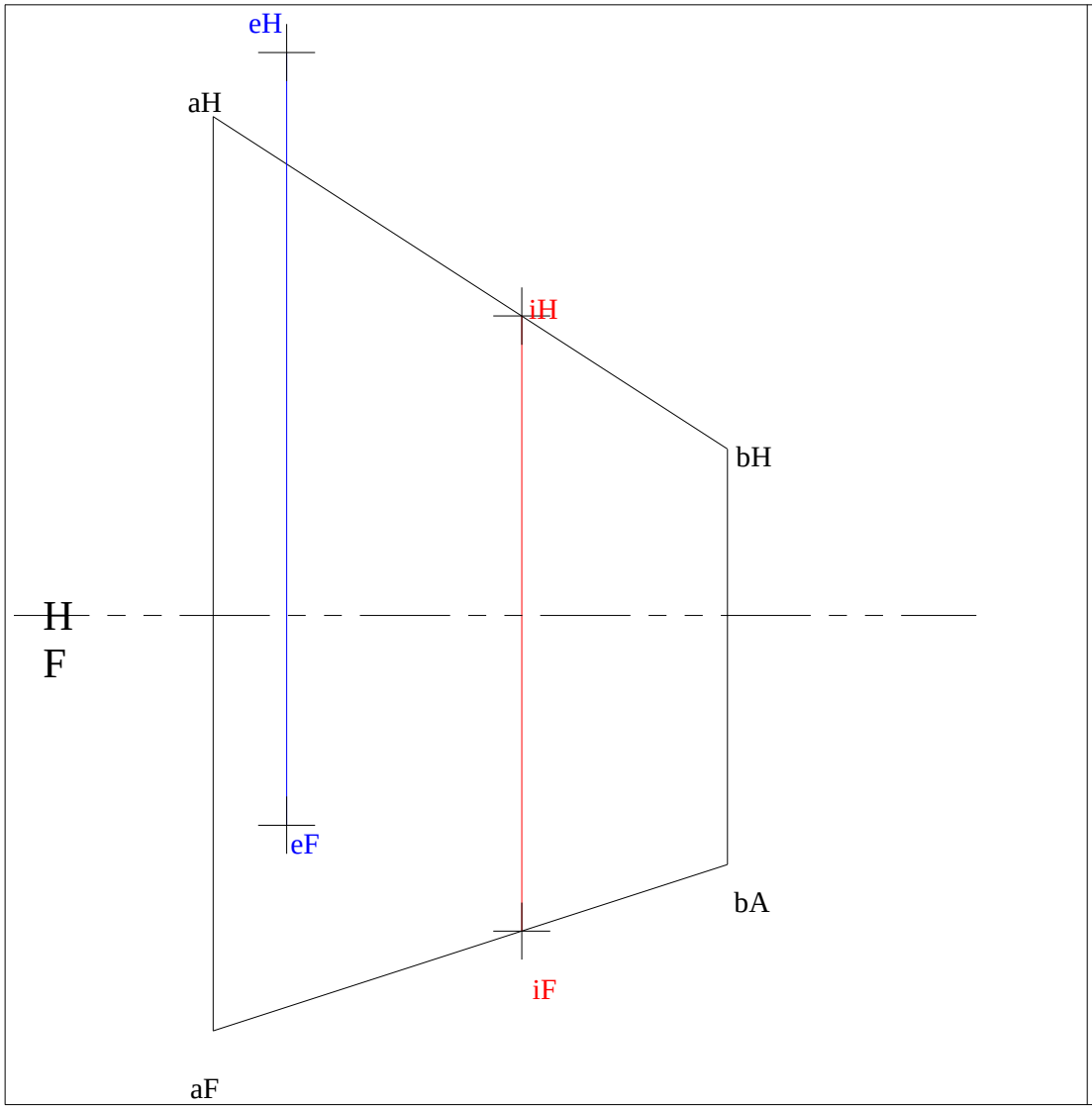


Draw planes that are perpendicular to line AB through points I and E respectively.

Location of a Plane

perpendicular to a line through a point



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Location of a Plane

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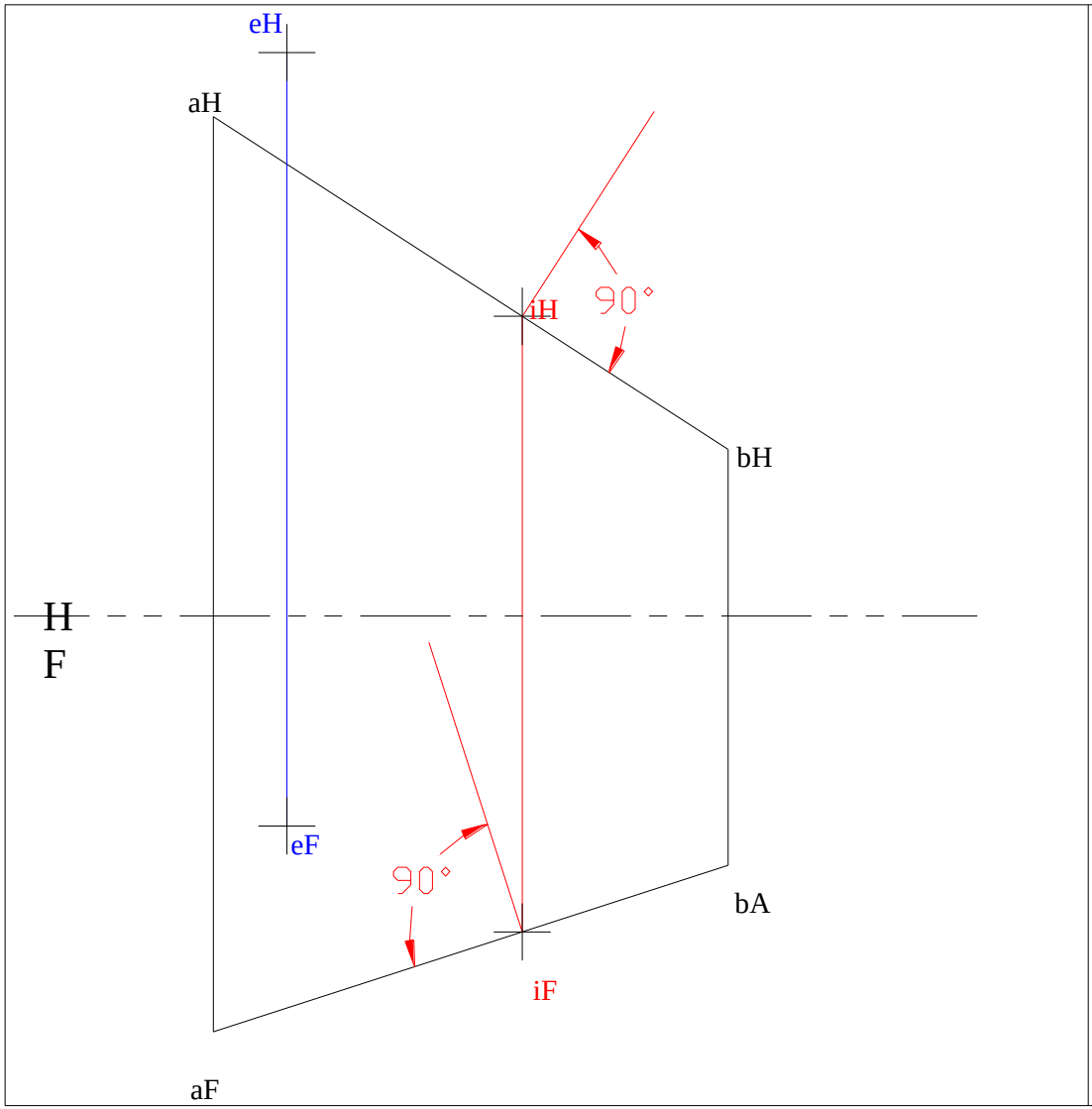


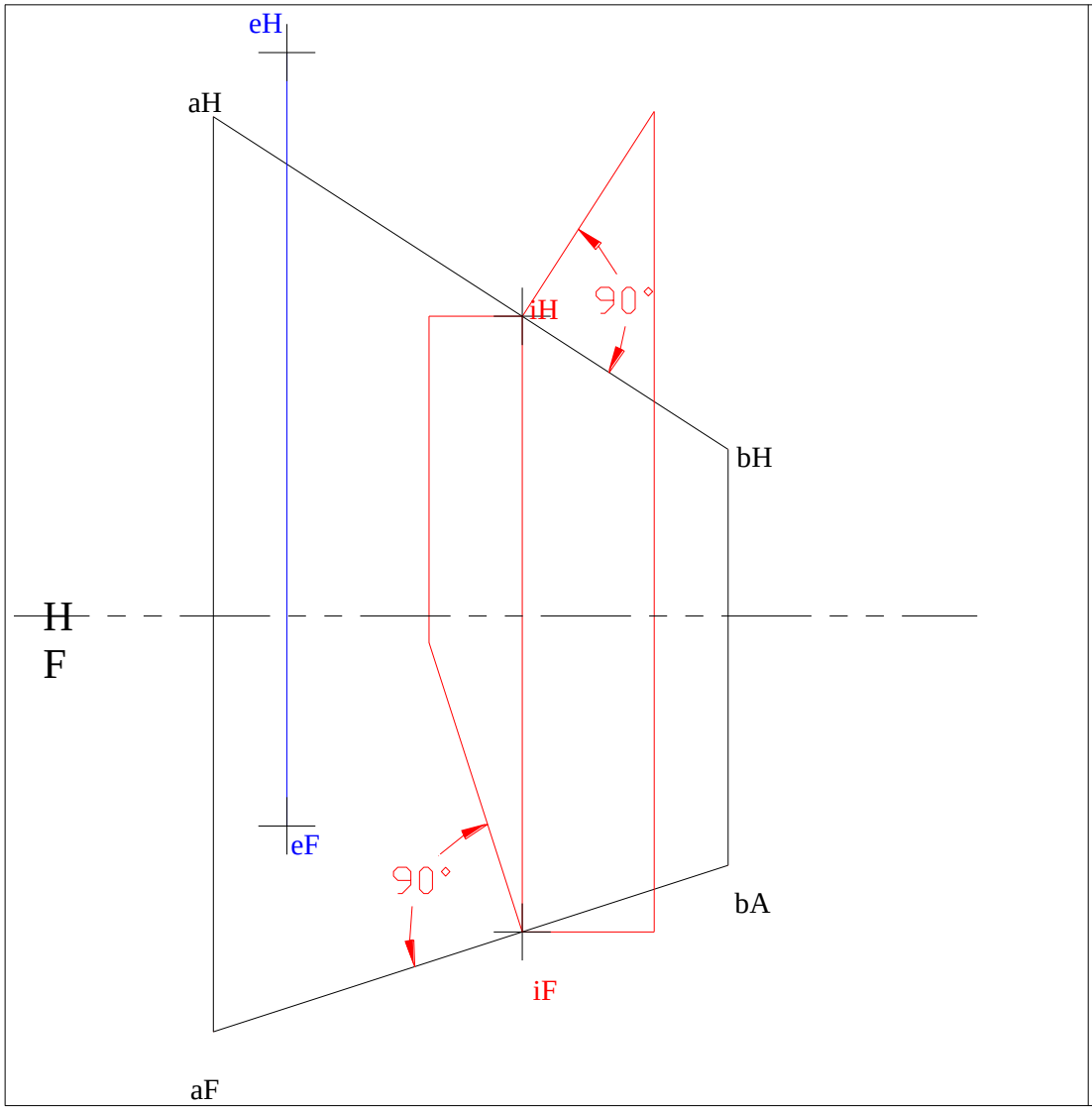
Draw planes that are perpendicular to line AB through points I and E respectively.

I belongs to AB, E does not belong to AB.

Draw lines that are perpendicular to line ab from point I in both FV and TV.

Location of a Plane

perpendicular to a line through a point



Draw planes that are perpendicular to line AB through points I and E respectively.

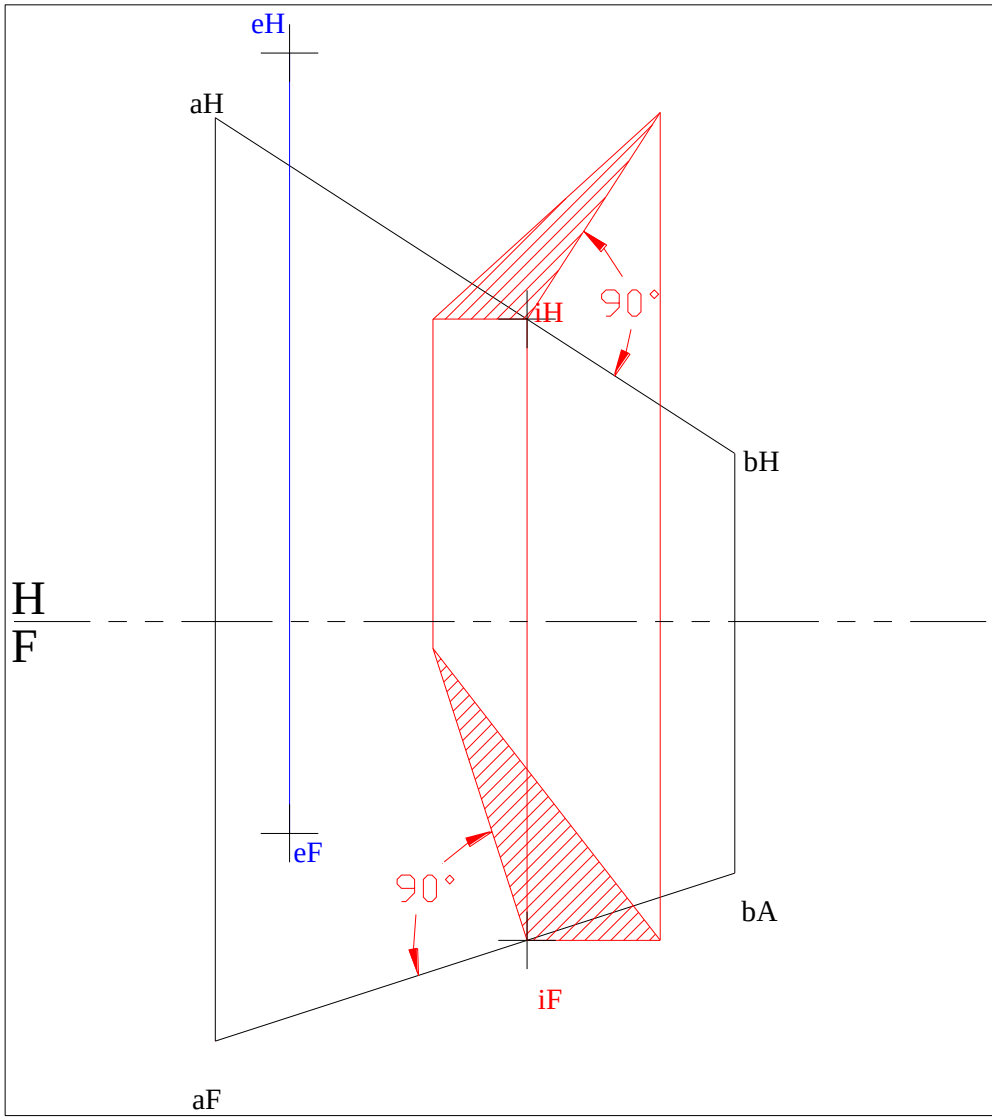
I belongs to AB, E does not belong to AB.

Draw lines that are perpendicular to line ab from point I in both FV and TV.

The perpendicular line must be TL. The projection in the adjacent view needs to be parallel to the folding line.

Location of a Plane

perpendicular to a line through a point



Draw planes that are perpendicular to line AB through points I and E respectively.

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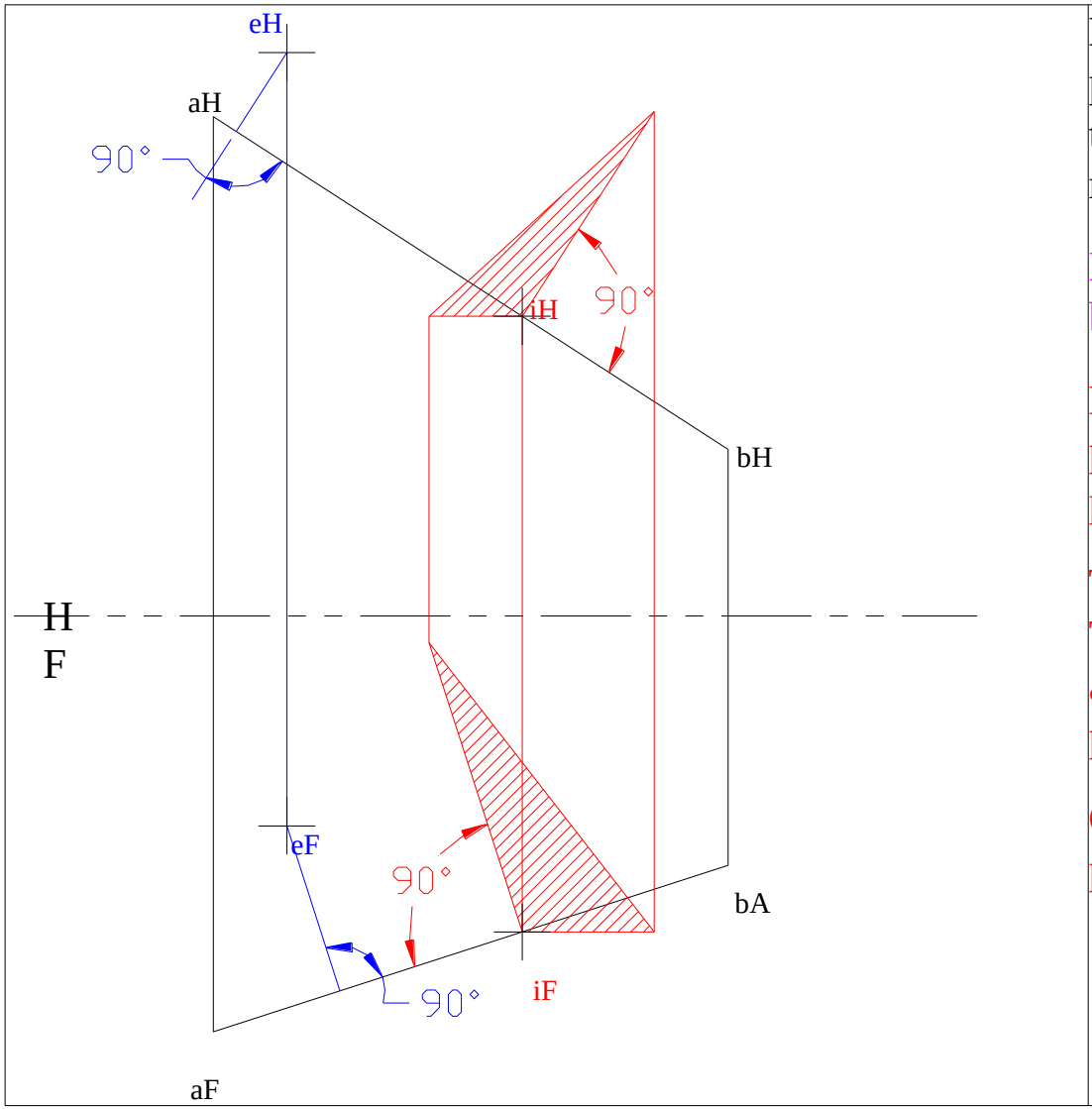
Draw lines that are perpendicular to line ab from point I in both FV and TV.

The perpendicular line must be TL. The projection in the adjacent view needs to be parallel to the folding line.

Complete the plane with the points that are obtained.

Location of a Plane

perpendicular to a line through a point



Draw planes that are perpendicular to line AB through points I and E respectively.

I belongs to AB, E does not belong to AB.

Draw lines that are perpendicular to line ab from point I in both FV and TV.

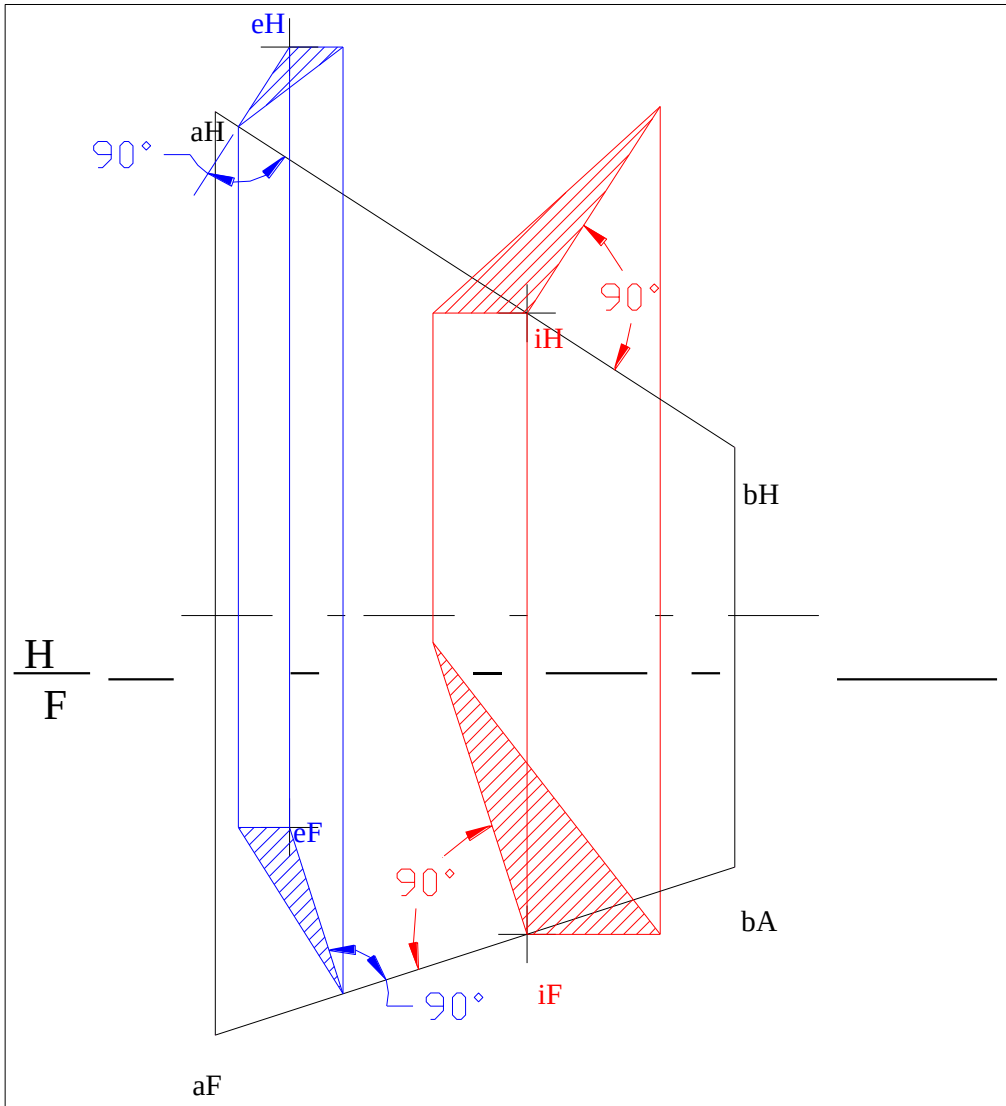
The perpendicular line must be TL. The projection in the adjacent view needs to be parallel to the folding line.

Complete the plane with the points that are obtained.

Draw lines perpendicular to line ab from point e in both FV and TV.

Location of a Plane

perpendicular to a line through a point



Draw planes that are perpendicular to line AB through points I and E respectively.

I belongs to AB, E does not belong to AB.

Draw lines that are perpendicular to line ab from point I in both FV and TV.

The perpendicular line must be TL. The projection in the adjacent view needs to be parallel to the folding line.

Complete the plane with the points that are obtained.

Projection of a Point to a Plane

(A) PROJECTION OF A POINT ON A PLANE

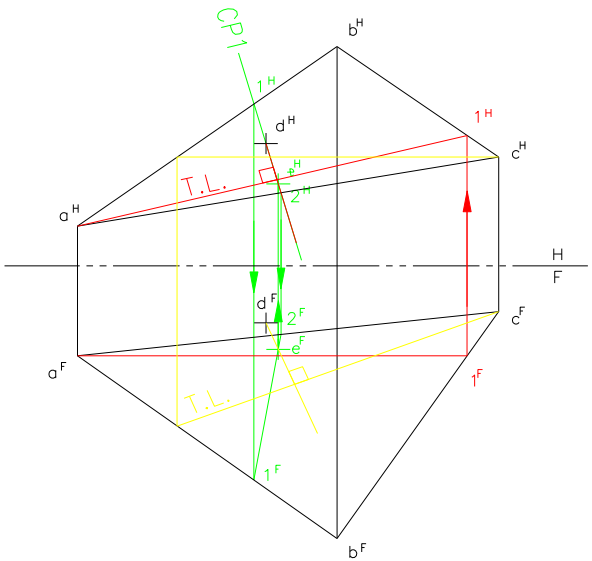
This problem may be conviniently subdivided into two:

1. Construction of a perpendicular from a geven point (D) to the plane (ABC).
2. Location of the point of intersection of the perpendicular with the plane.

1. A perpendicular to a plane must be perpendicular to any two lines in that plane.

A right angle is seen as such if one of the lines forming it is a True Length.

The horizontal projection of the perpendicular from D to ABC is located.



The frontal projection of the perpendicular is located.

2. The intersection of the perpendicular with the plane (E) is located with the help of cutting plane CP1 passing through horizontal projection of the perpendicular.

The point of intersection with the plane is found on the intersection of the perpendicular and the trace (12) of the cutting plane on ABC in the frontal view and projected back to the horizontal view.

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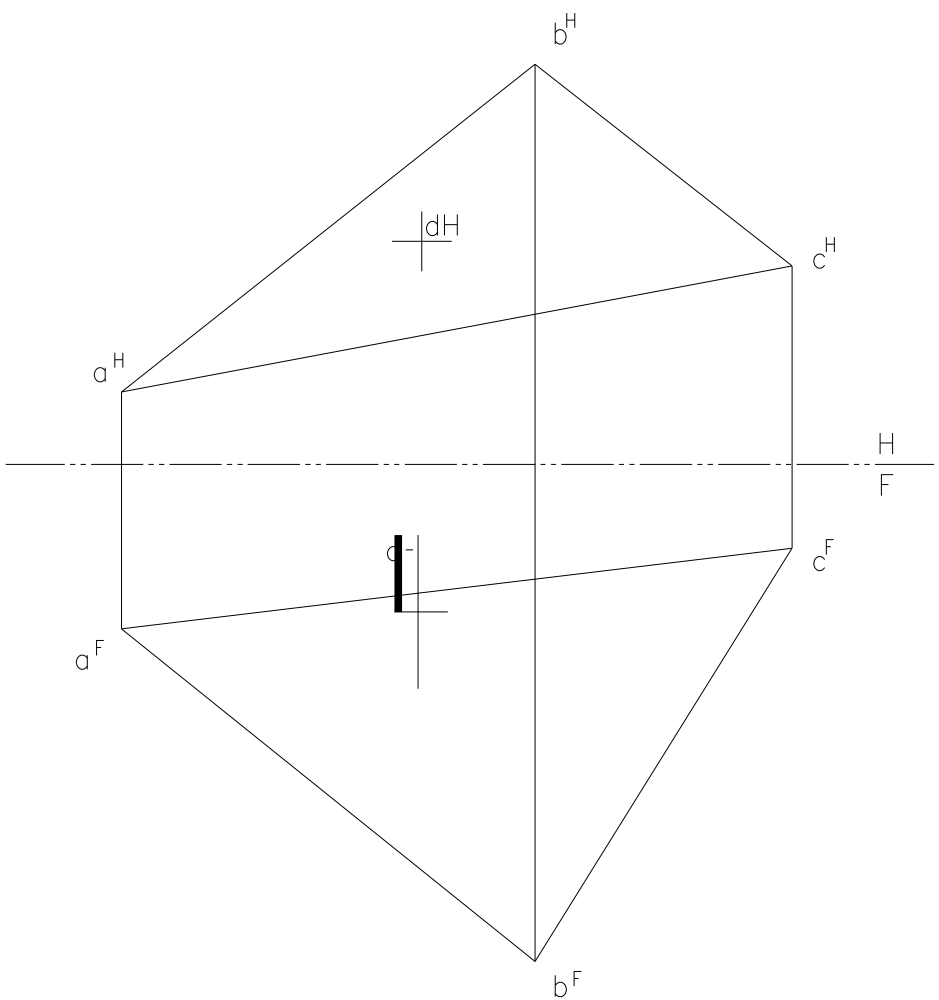
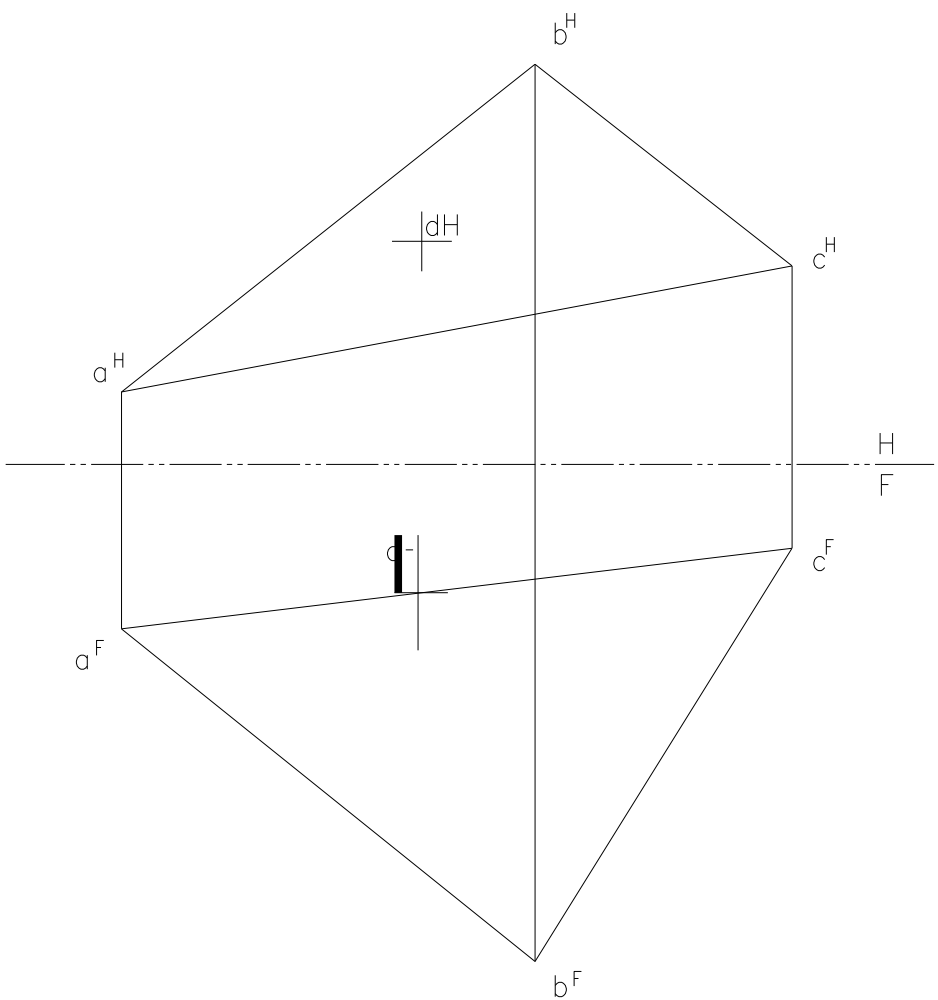
Number	Name	Date	Assignment
L05T05			

Projection of a Point to a Plane



Projection of a point on a plane is like a shadow of point on the plane due to light shining perpedicular to the plane

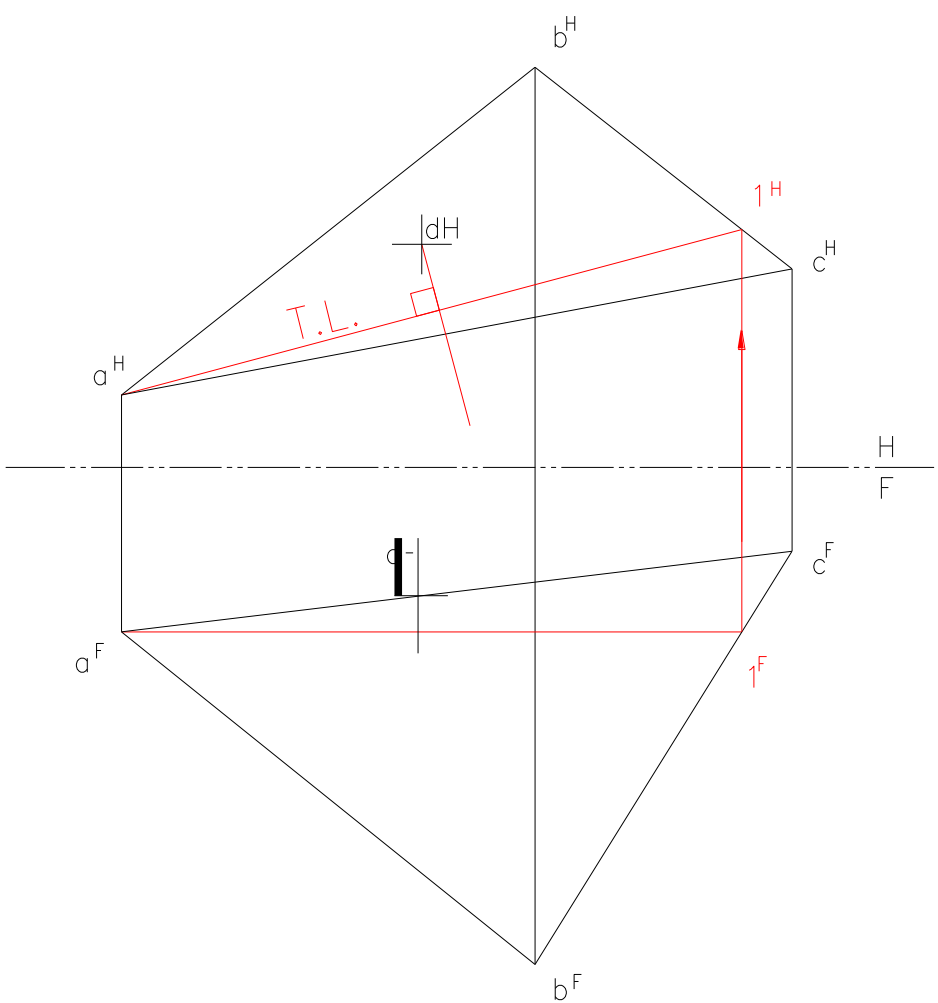
Projection of a Point to a Plane



Projection of a point on a plane is like a shadow of point on the plane due to light shining perpedicular to the plane

This problem may be conviniently subdivided into two:
1. Construction of a perpendicular from a geven point (D) to the plane (ABC).
2. Location of the point of intersection of the perpendicular with the plane.

Projection of a Point to a Plane



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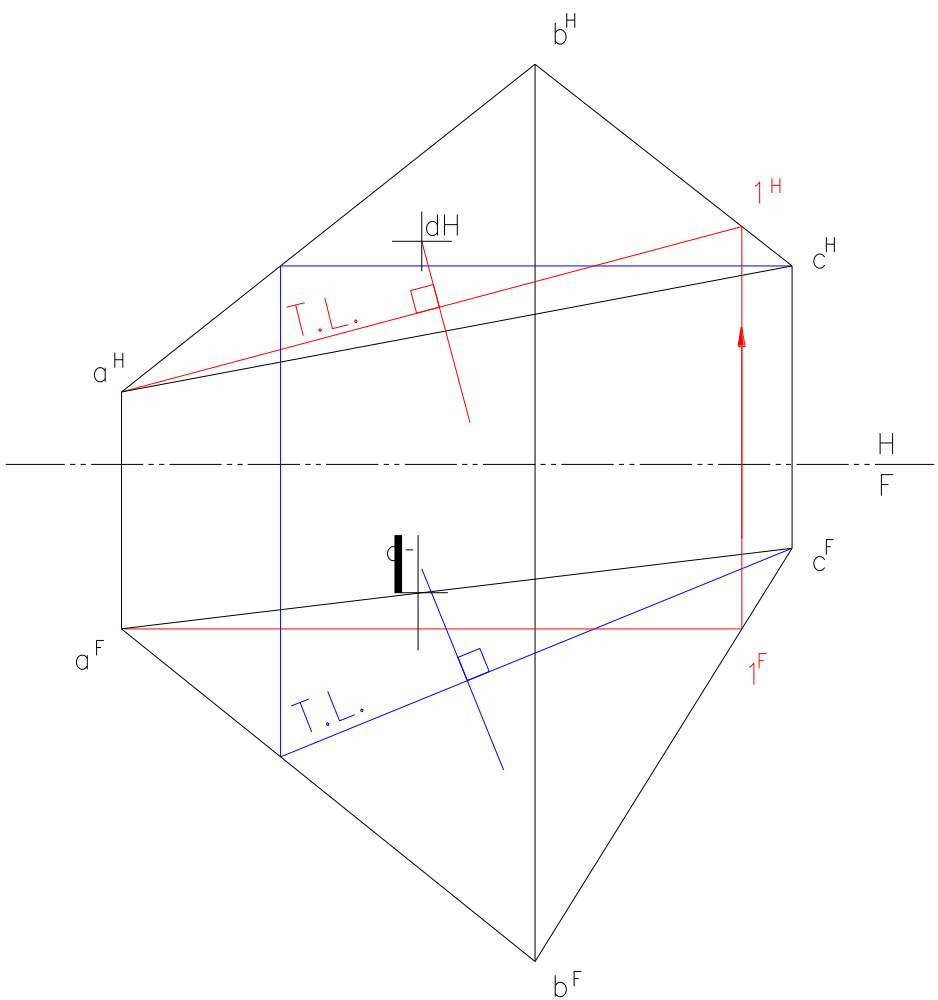
1. A perpendicular to a plane must be perpendicular to any two lines in that plane.
A right angle is seen as such if one of the lines forming it is a True Length.
The horizontal projection of the perpendicular from D to ABC is located.

Projection of a Point to a Plane



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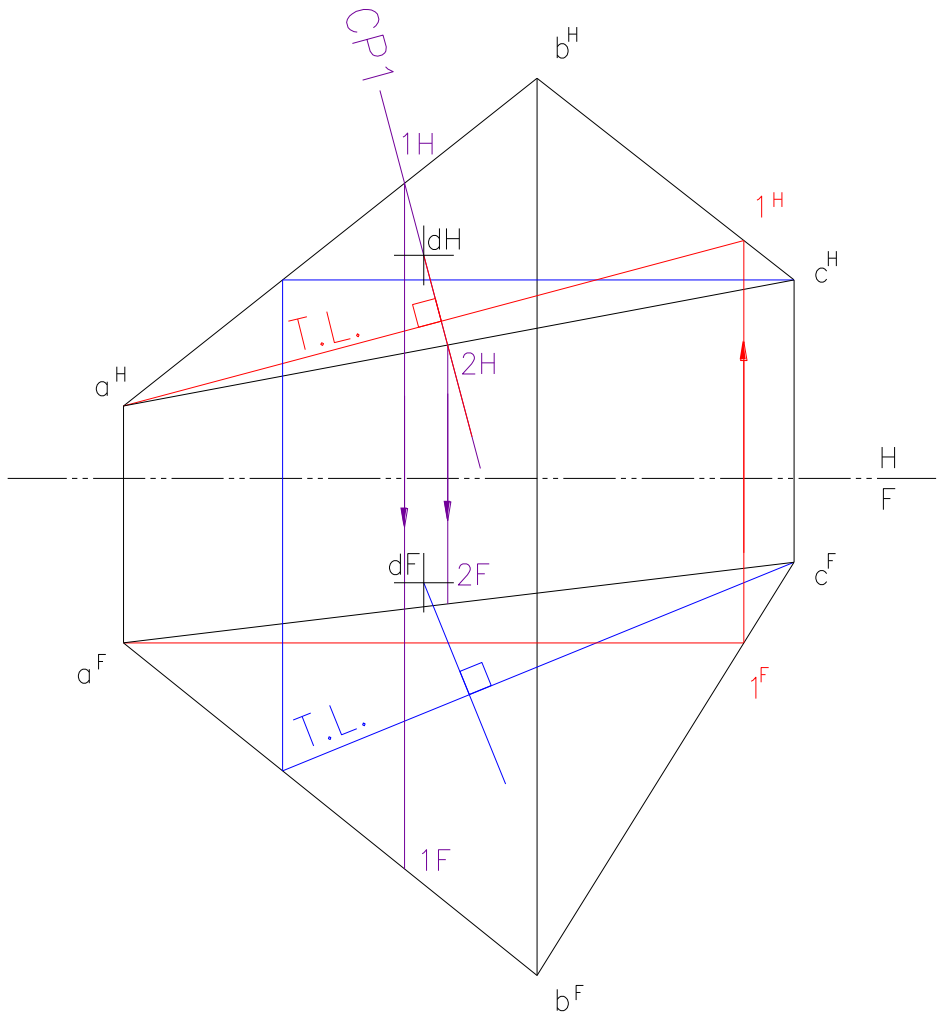
Similarly the frontal projection of the perpendicular is located.

Projection of a Point to a Plane



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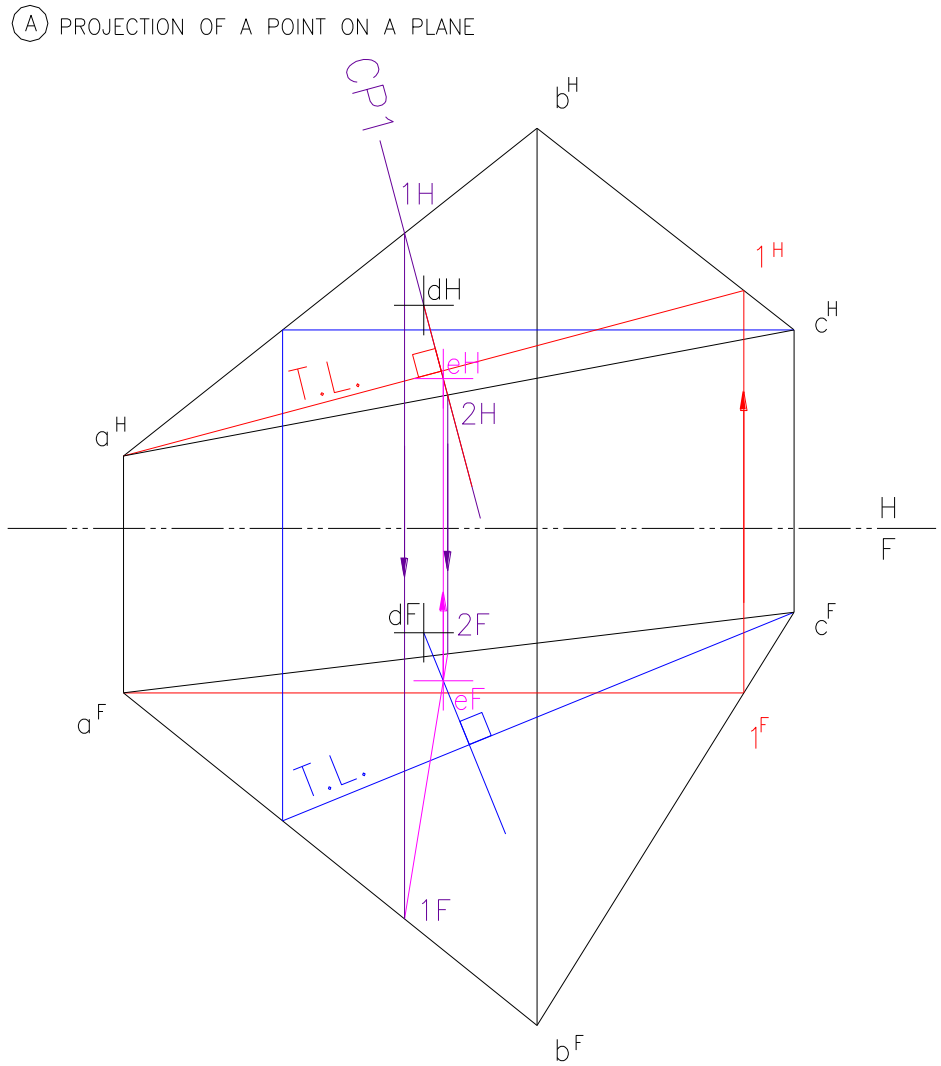
A right angle is seen as such if one of the lines forming it is a True Length.
The horizontal projection of the perpendicular from D to ABC is located.

Similarly the frontal projection of the perpendicular is located.

2. The intersection (E) of the perpendicular with the plane is located with the help of cutting plane CP1 passing through horizontal projection of the perpendicular.

Projection of a Point to a Plane



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A right angle is seen as such if one of the lines forming it is a True Length.
The horizontal projection of the perpendicular from D to ABC is located.

Similarly the frontal projection of the perpendicular is located.

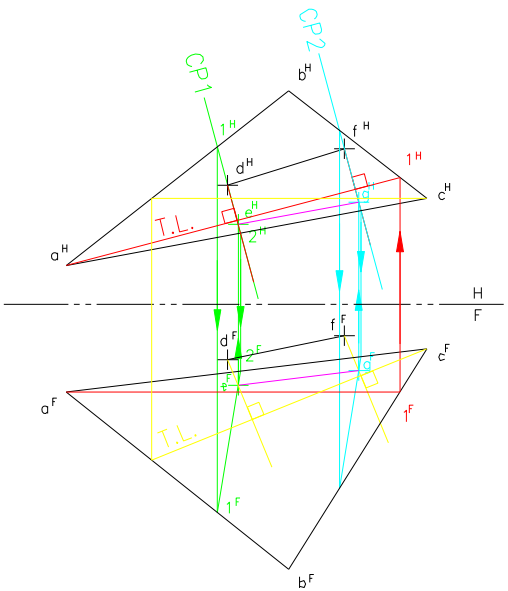
2. The intersection (E) of the perpendicular with the plane is located with the help of cutting plane CP1 passing through horizontal projection of the perpendicular.

The point of intersection with the plane is found on the intersection of the perpendicular and the trace (12) of the cutting plane on ABC in the frontal view and projected back to the horizontal view.

Projection of a line on a plane

Ⓐ PROJECTION OF A LINE ON A PLANE

Project line DF onto plane ABC.
A line can be located by determining the position of two points of that line.
Therefore a projection of the line can be obtained by projecting any two points of that line. (See L05T05 for details on construction of projection of a point on a line).



Number	Name	Date	Assignment
L05T06			

Projections of points:
1. Construction of a perpendicular from given points (D, F) to the plane (ABC).
2. Location of the points of intersection of the perpendiculars with the plane.

1. A perpendicular to a plane must be perpendicular to any two lines in that plane.
A right angle is seen as such if one of the lines forming it is a True Length.
The horizontal projections of the perpendiculars from D and F to ABC are located.

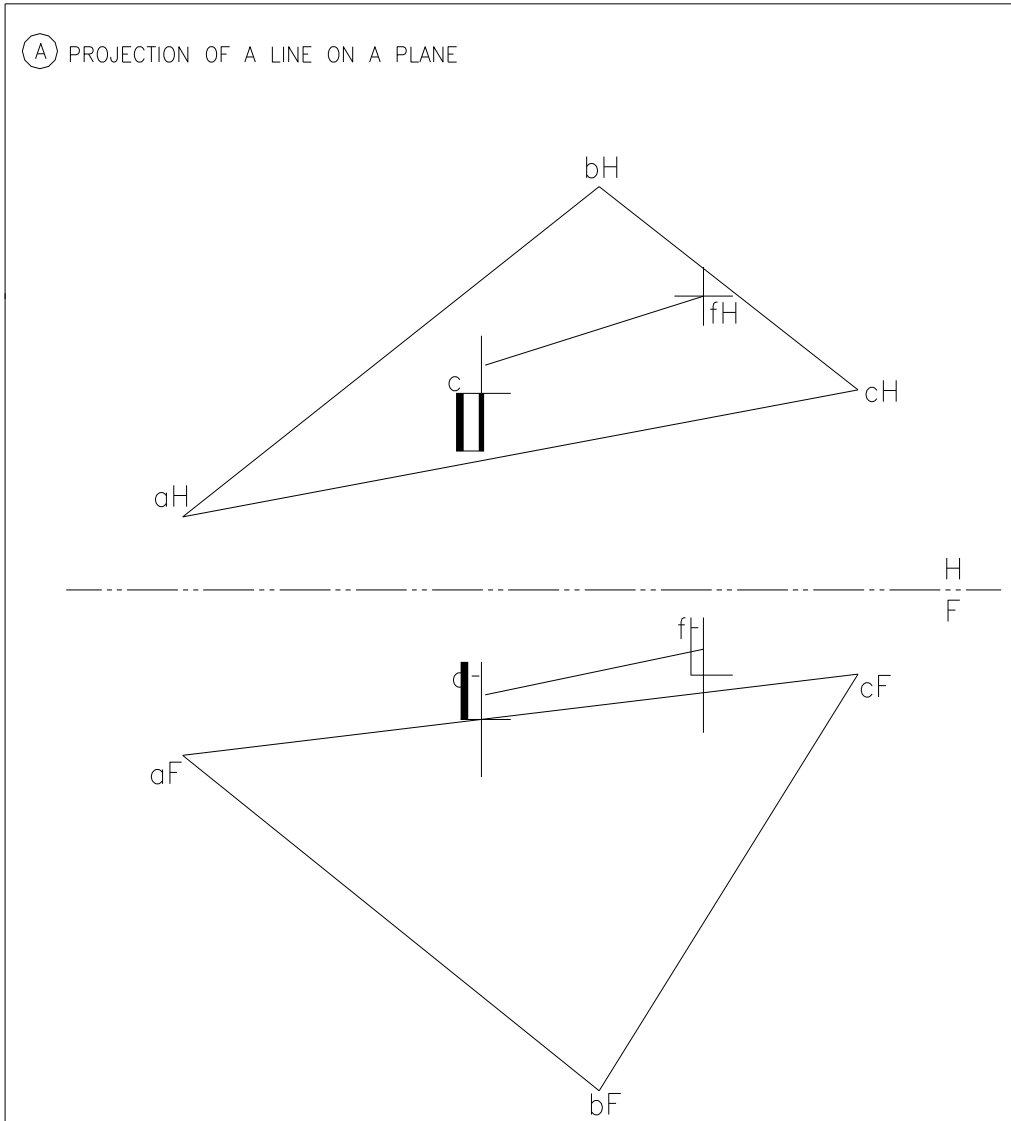
The frontal projections of the perpendiculars are located.

2. The intersection of the perpendiculars from E and F with the plane are located with the help of cutting planes CP1 and CP2 respectively.

The projection of the line is drawn through the projected points.

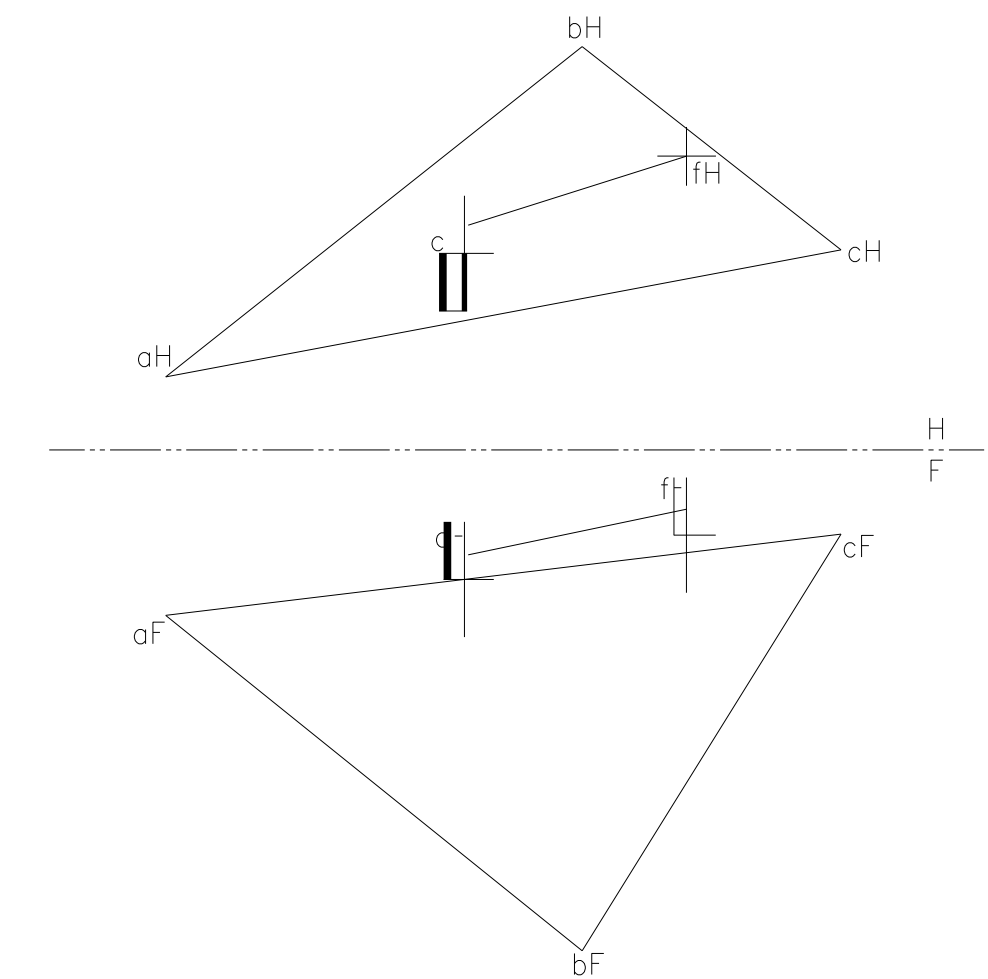
Number	Name	Date	Assignment
L05T06			

Projection of a Line on a Plane



Project line DF onto plane ABC.
A line can be located by determining the position of two points of that line.
Therefore a projection of the line can be obtained by projecting any two points of that line. (See L05T05 for details on construction of projection of a point on a line)

Projection of a Line on a Plane



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A line can be located by determining the position of two points of that line.
Therefore a projection of the line can be obtained by projecting any two points of that line. (See L05T05 for details on construction of projection of a point on a line).

Projections of points:
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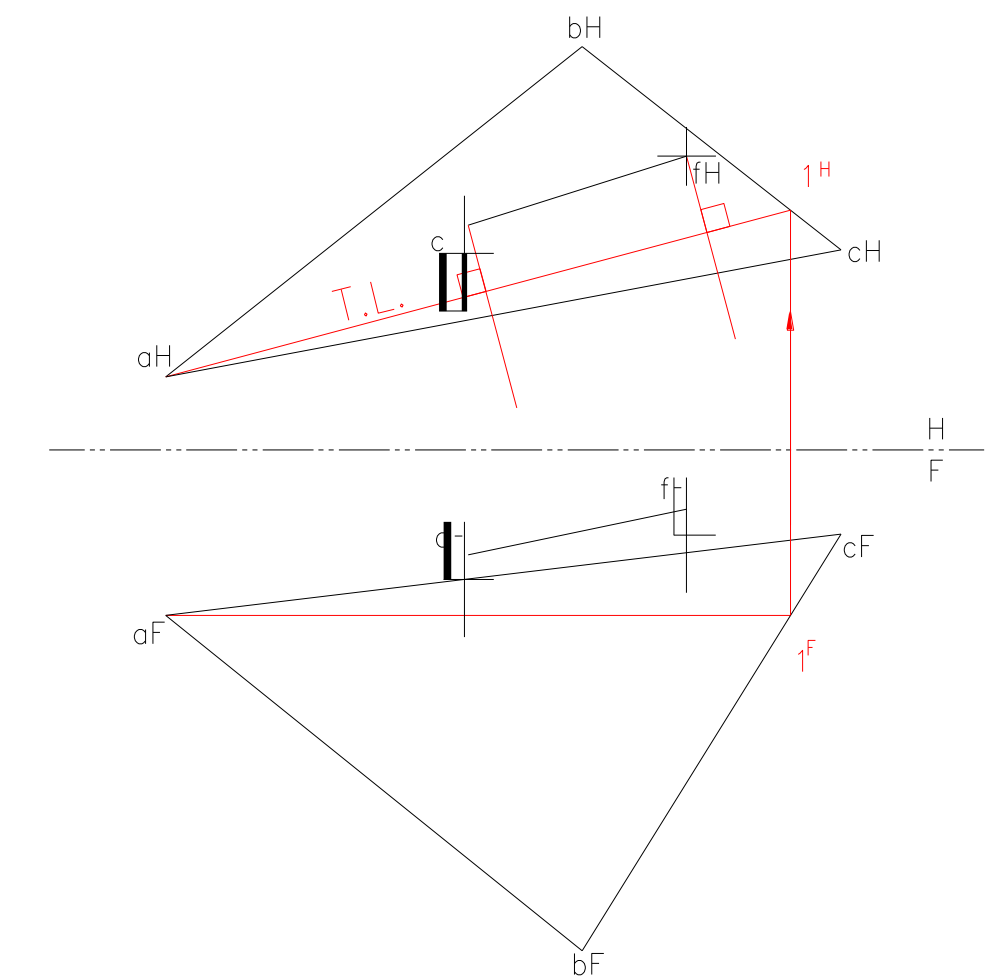
2. Location of the points of intersection of the perpendiculars with the plane.

Projection of a Line on a Plane



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A line can be located by determining the position of two points of that line.
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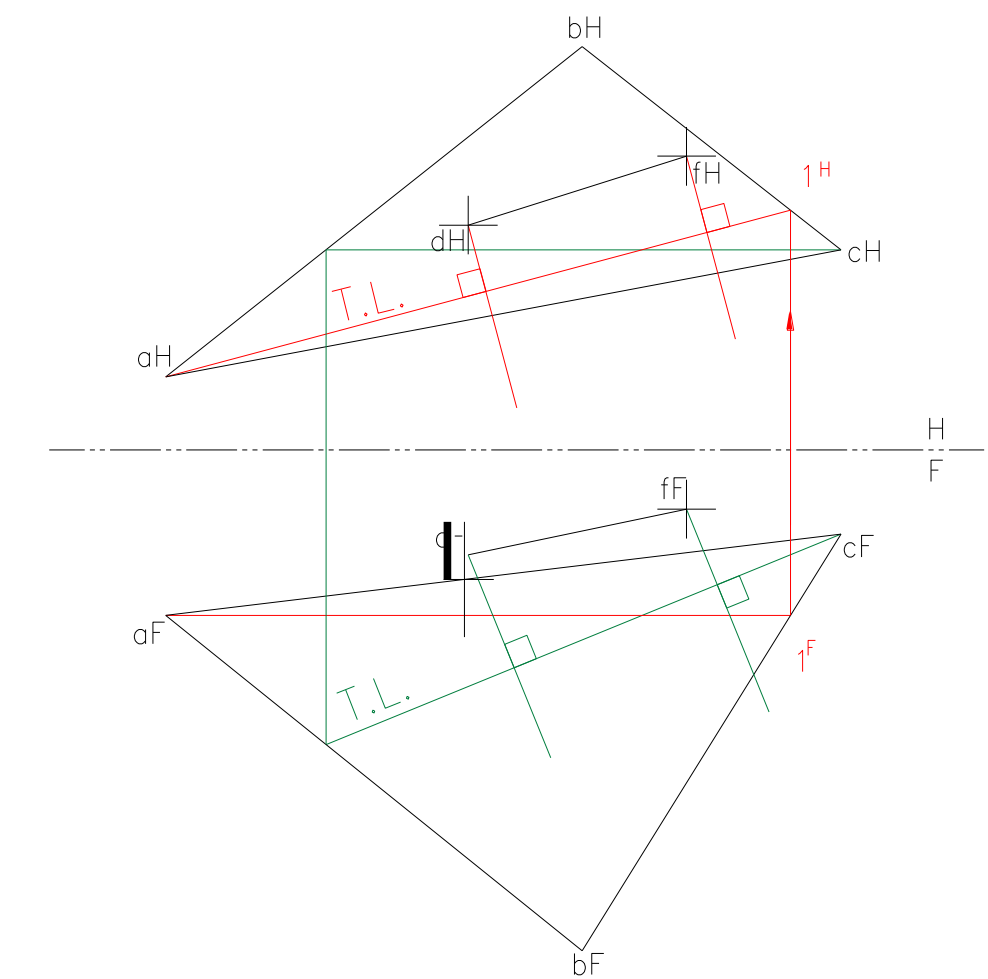
2. Location of the points of intersection of the perpendiculars with the plane.

1. A perpendicular to a plane must be perpendicular to any two lines in that plane.
A right angle is seen as such if one of the lines forming it is a True Length.
The horizontal projections of the perpendiculars from D and F to ABC are located.

Projection of a Line on a Plane



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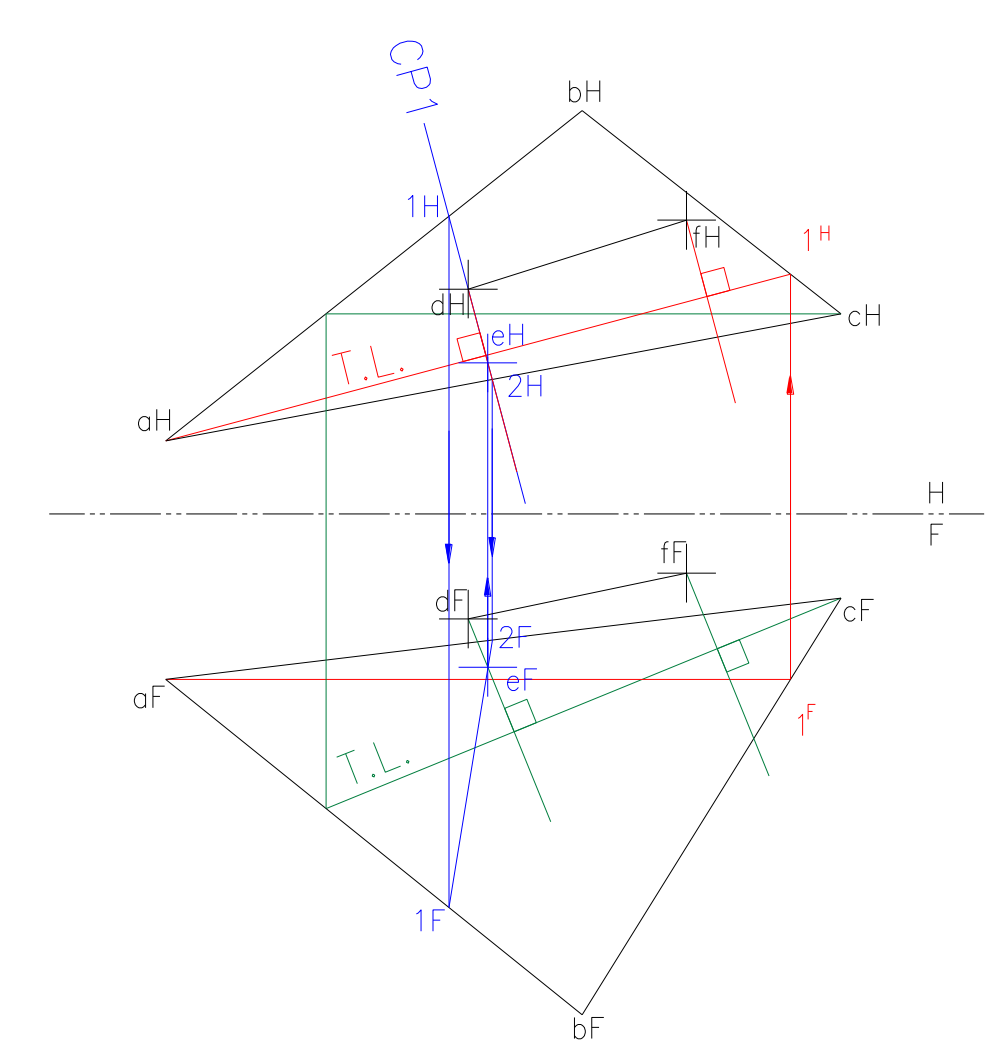

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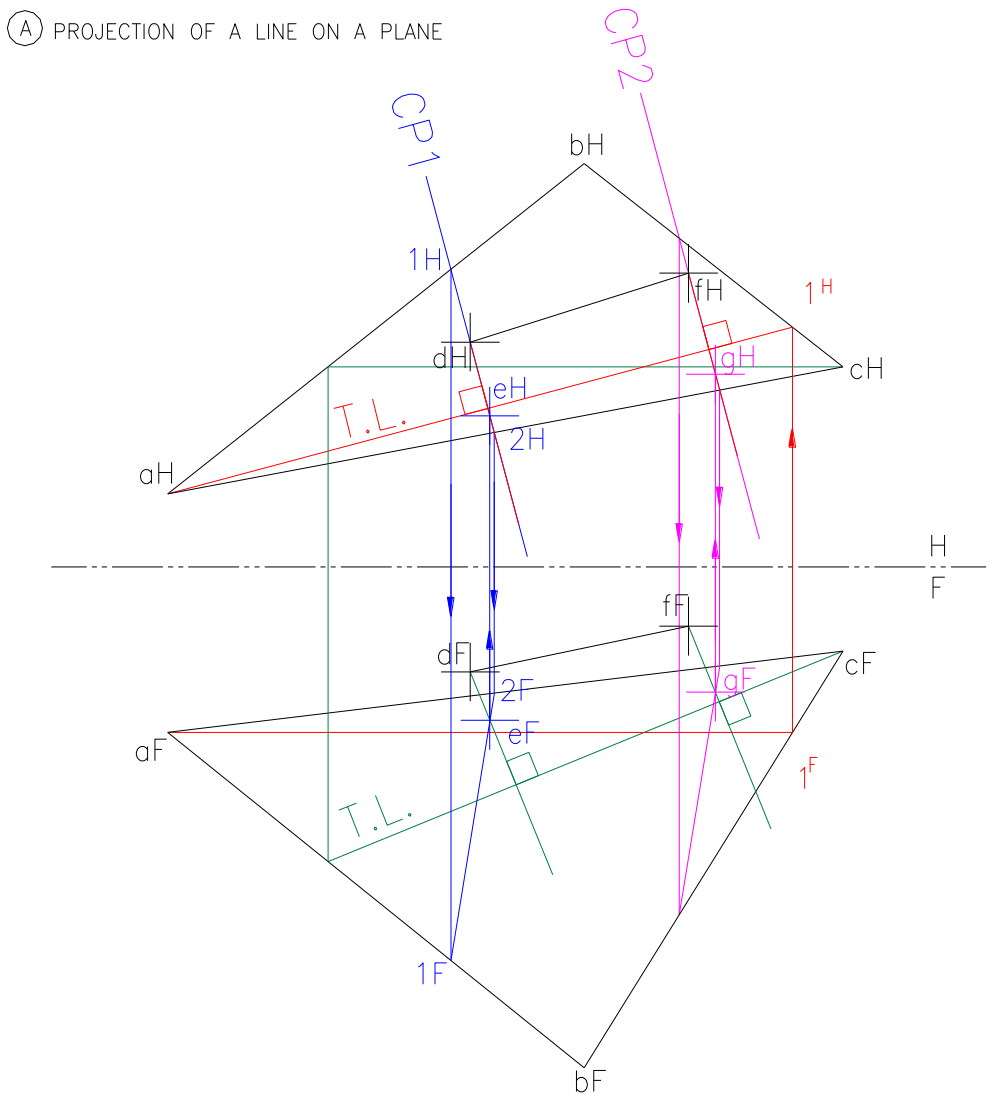
Projection of a Line on a Plane



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1. A perpendicular to a plane must be perpendicular to any two lines in that plane.
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The horizontal projections of the perpendiculars from D and F to ABC are located.

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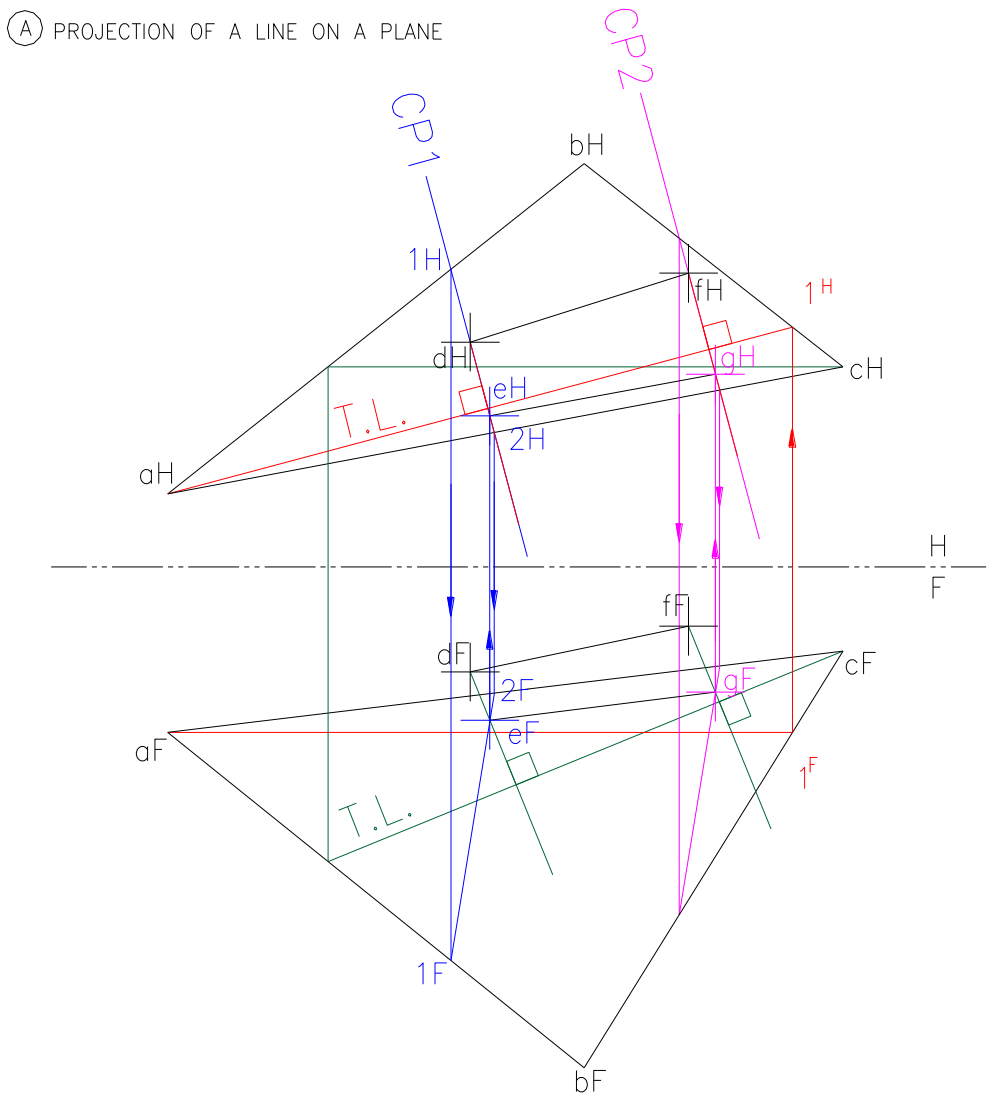
Projection of a Line on a Plane



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Projections of points:
1. Construction of a perpendicular from given points (D, F) to the plane (ABC).
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A right angle is seen as such if one of the lines forming it is a True Length.
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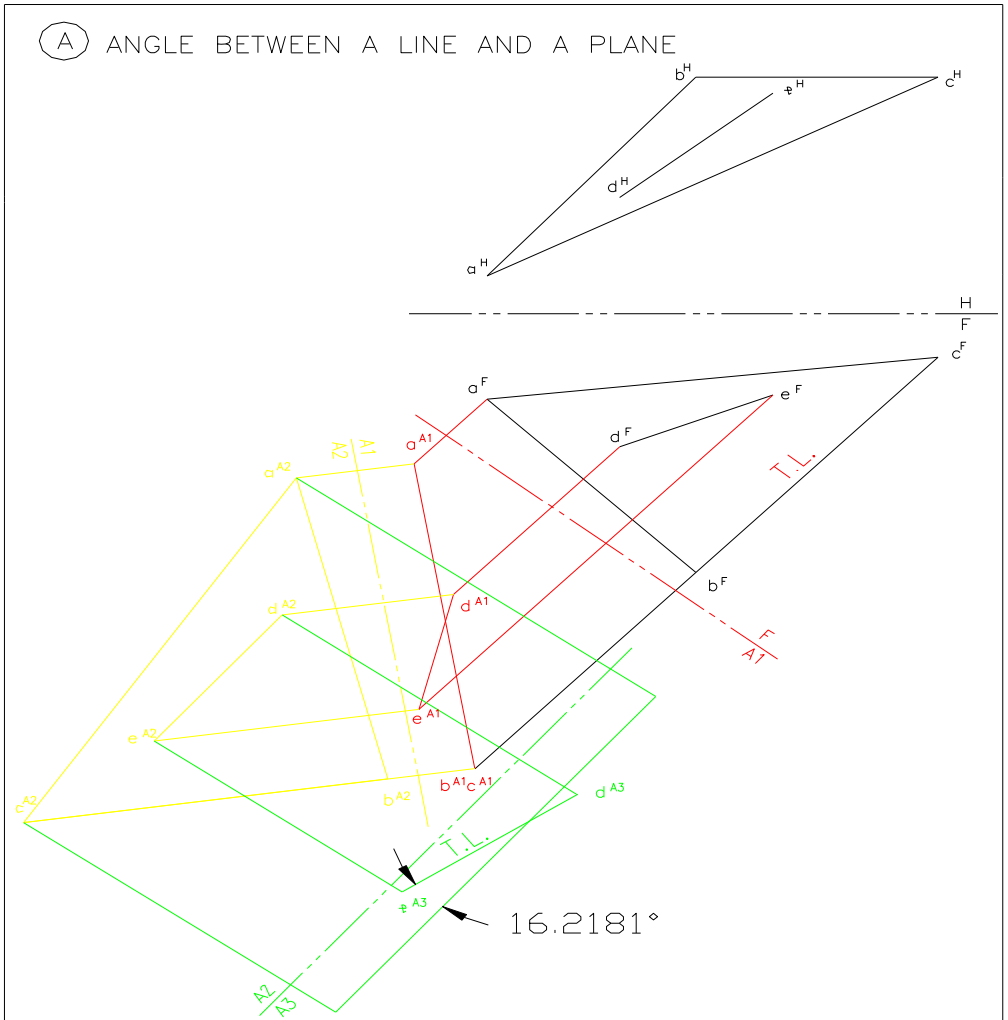
The frontal projections of the perpendiculars are located.

2. The intersection of the perpendiculars from E and F with the plane are located with the help of cutting planes CP1 and CP2 respectively.

The projection of the line is drawn through the projected points.

Angle of a line with a plane



Number	Name	Date	Assignment
L05T08			

The angle between a line and a plane is seen as a true size in a view that shows the line as a True Length and the plane as an edge view simultaneously.

To obtain that view we shall:
1). show the plane as a True Shape, so that any next adjacent view of it will be an edge view;
2). choose the adjacent view so that the line appears as a True Length The plane will appear as an edge view automatically.

The Edge View of the plane.

The True Shape of the plane.
The plane itself need not be drawn for the solution;
any line parallel to the next reference line may be used to determine the angle.

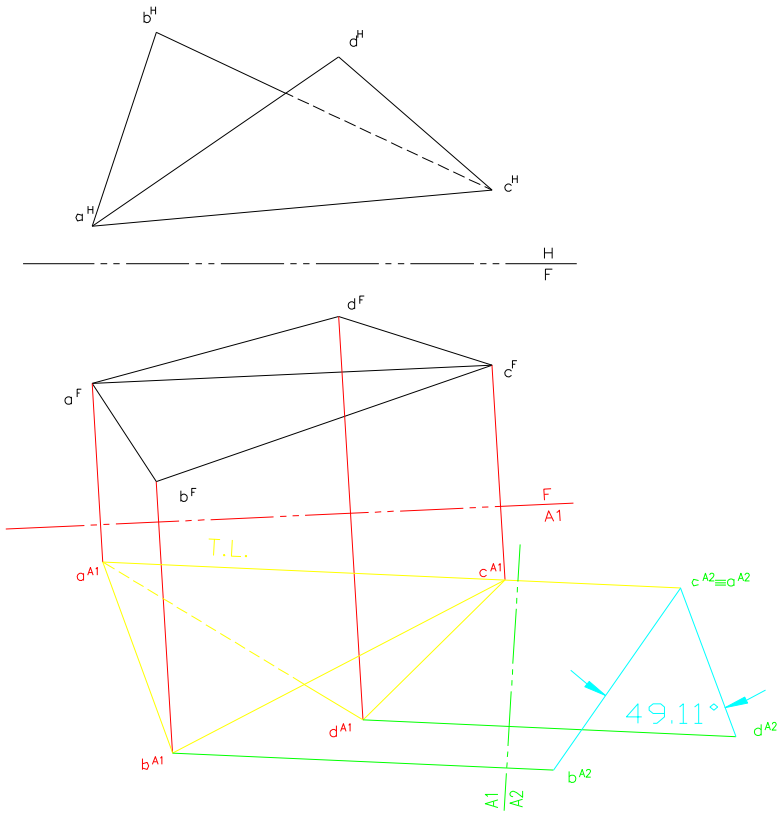
The True Length of the line and the edge view of the plane view where we can measure the wanted angle.

Number	Name	Date	Assignment
L05T08			

Dihedral angle of two planes

(A) DIHEDRAL ANGLE

Find the angle formed by the planes ACB and ACD.



Number	Name	Date	Assignment
L05T07			

The dihedral angle must be measured in a plane perpendicular to the line of intersection of the planes.

Therefore in the view showing the angle as a True Size the line of intersection will appear as a point.

Obtain the line of intersection as a point view.

Point view of the line of intersection AB.

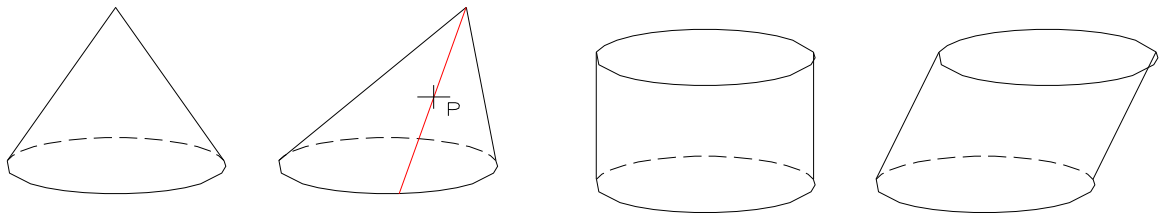
Measure the dihedral angle in the true shape of the plane perpendicular to the line of intersection:

Number	Name	Date	Assignment
L05T07			

Point on a conical surface

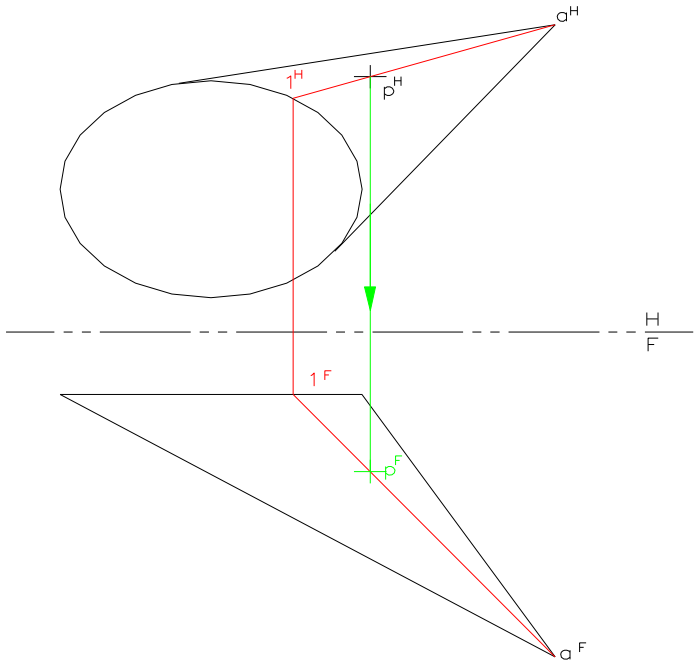
(A) SINGLE CURVED SURFACES

are such ruled surfaces that may be generated by moving a straight line along a curve so that any next position of the line is either parallel or intersecting its previous position.



right cone oblique cone right cylinder oblique cylinder

LOCATION OF A POINT ON A CONE/CYLINDER



A point on the surface must belong to some surface element, 1A in this case.

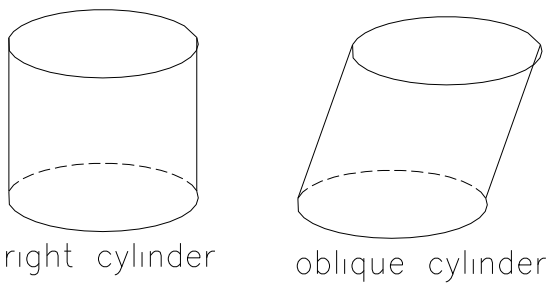
Position of the point in other views is located on the same element by projection.

Single curved surfaces

Location of a point on a Cone/Cylinder

(A) SINGLE CURVED SURFACES

are such ruled surfaces that may be generated by moving a straight line along a curve so that any next position of the line is either parallel to its previous position



right cylinder

oblique cylinder

Single curved surfaces
Location of a point on a Cone/Cylinder

(A) SINGLE CURVED SURFACES

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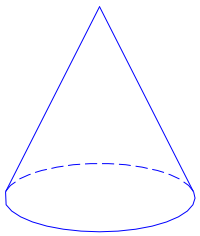
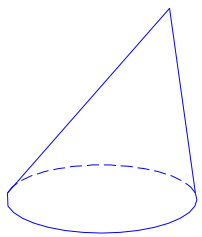
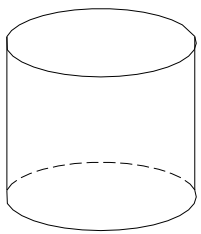


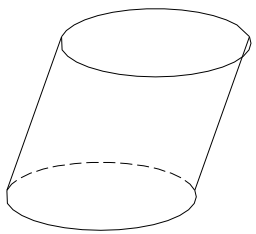
right cone



oblique cone



right cylinder



oblique cylinder

Single curved surfaces
Location of a point on a Cone/Cylinder

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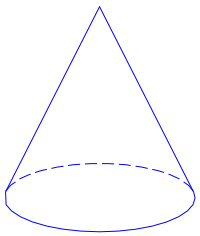
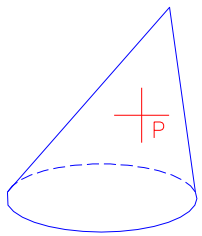
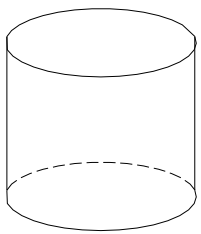


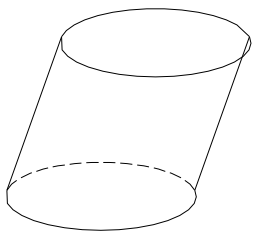
right cone



oblique cone



right cylinder



oblique cylinder

(B) LOCATION OF A POINT ON A CONE/CYLINDER

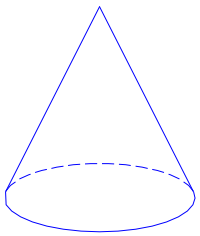
How to locate point P which is on the surface of the oblique cone in the views?

Single curved surfaces
Location of a point on a Cone/Cylinder

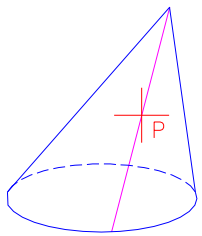
(A) SINGLE CURVED SURFACES

are such ruled surfaces that may be generated by moving a straight line along a curve so that any next position of the line is either parallel to its previous position

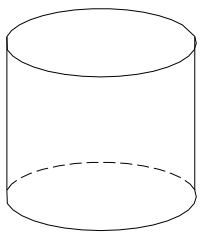
or intersecting its previous position.



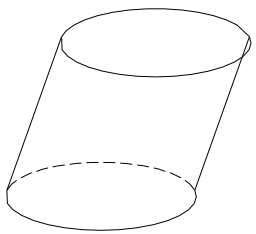
right cone



oblique cone



right cylinder

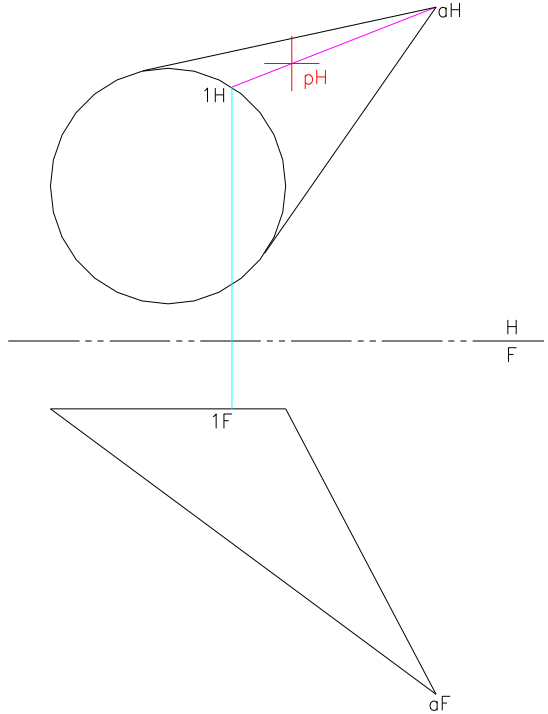


oblique cylinder

(B) LOCATION OF A POINT ON A CONE/CYLINDER

How to locate point P which is on the surface of the oblique cone in the views?

A point on the surface must belong to some surface element, 1A in this case.



Single curved surfaces
Location of a point on a Cone/Cylinder

(A) SINGLE CURVED SURFACES

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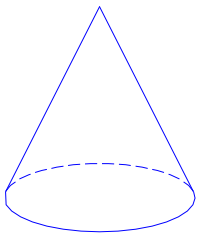
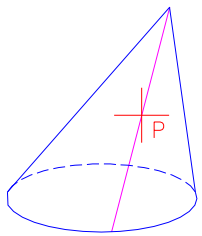


right cone



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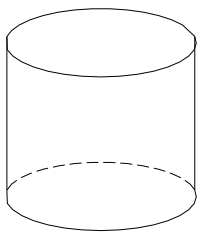
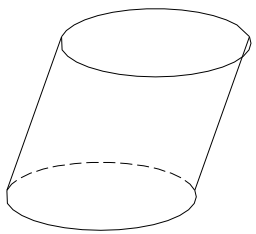


right cylinder

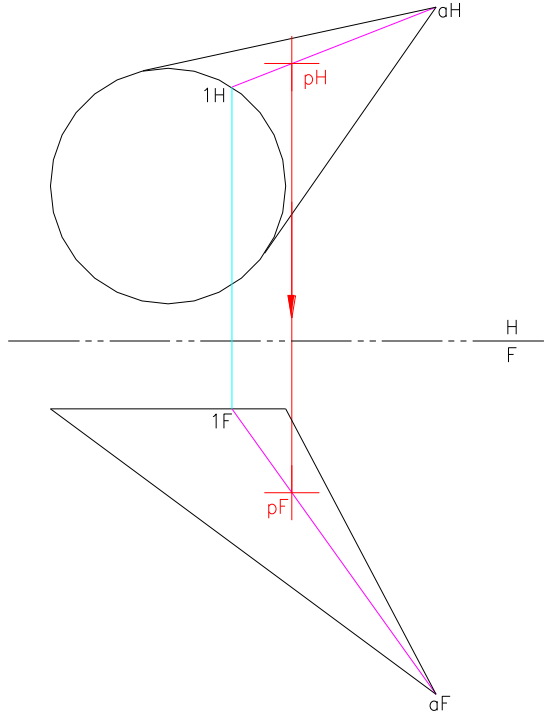


oblique cylinder

(B) LOCATION OF A POINT ON A CONE/CYLINDER

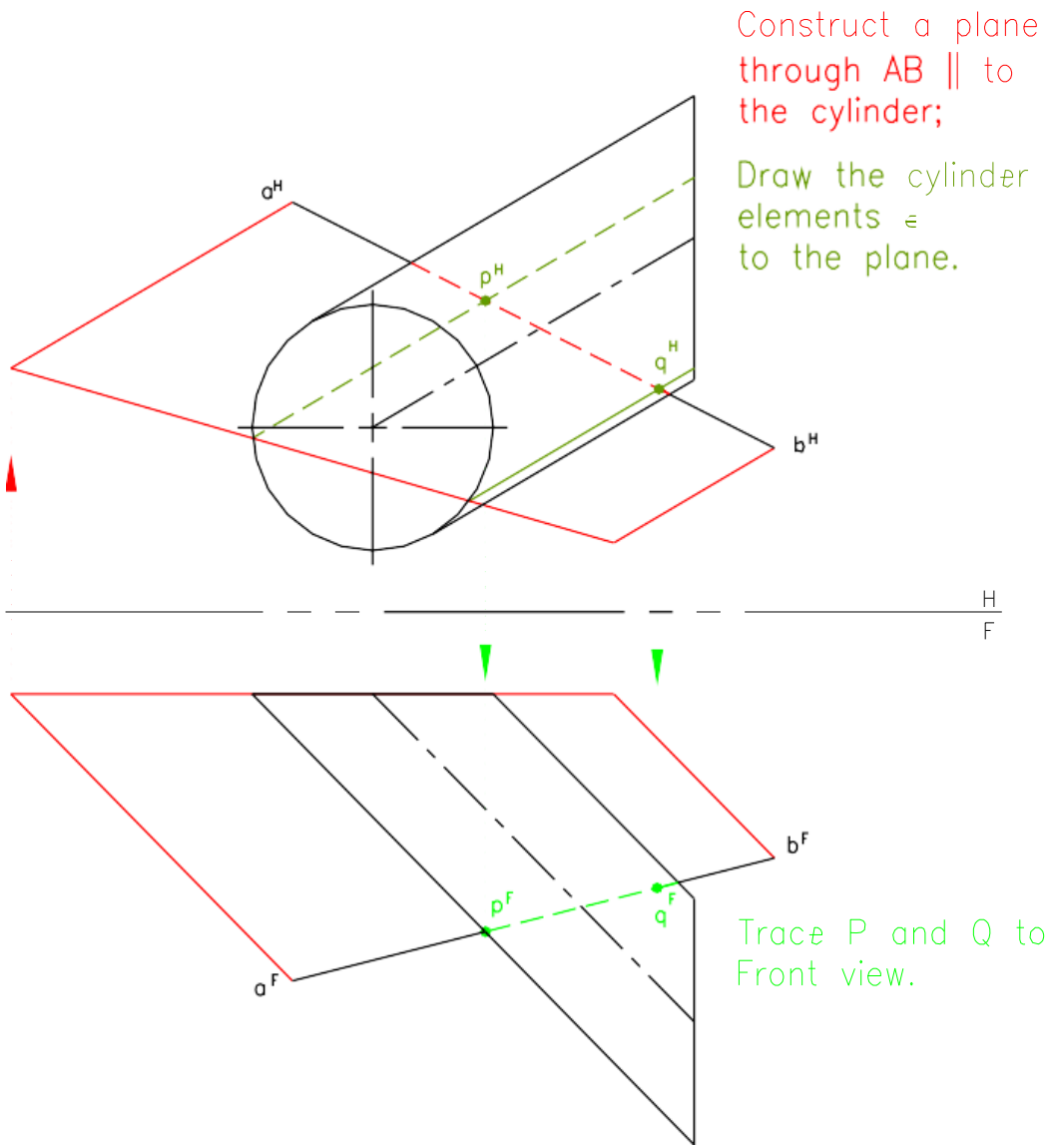
How to locate point P which is on the surface of the oblique cone in the views?

A point on the surface must belong to some surface element, 1A in this case.

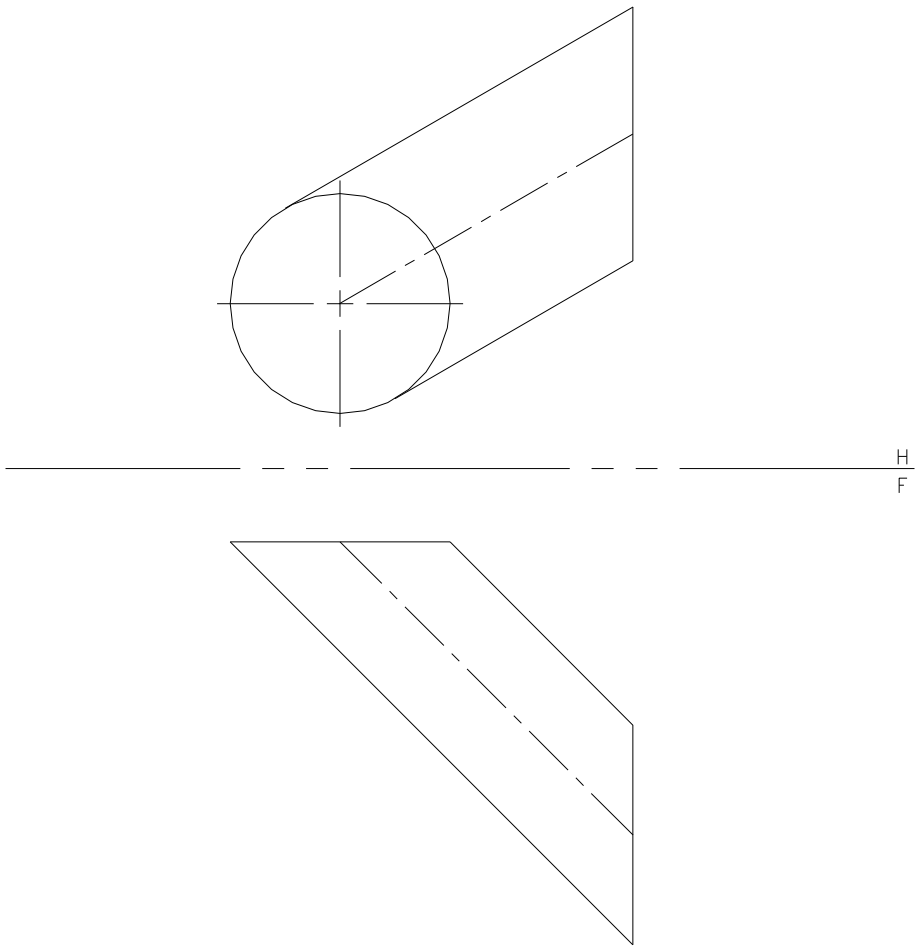


Position of the point in other views is located on the same element by projection.

Intersection of a line with a cylinder

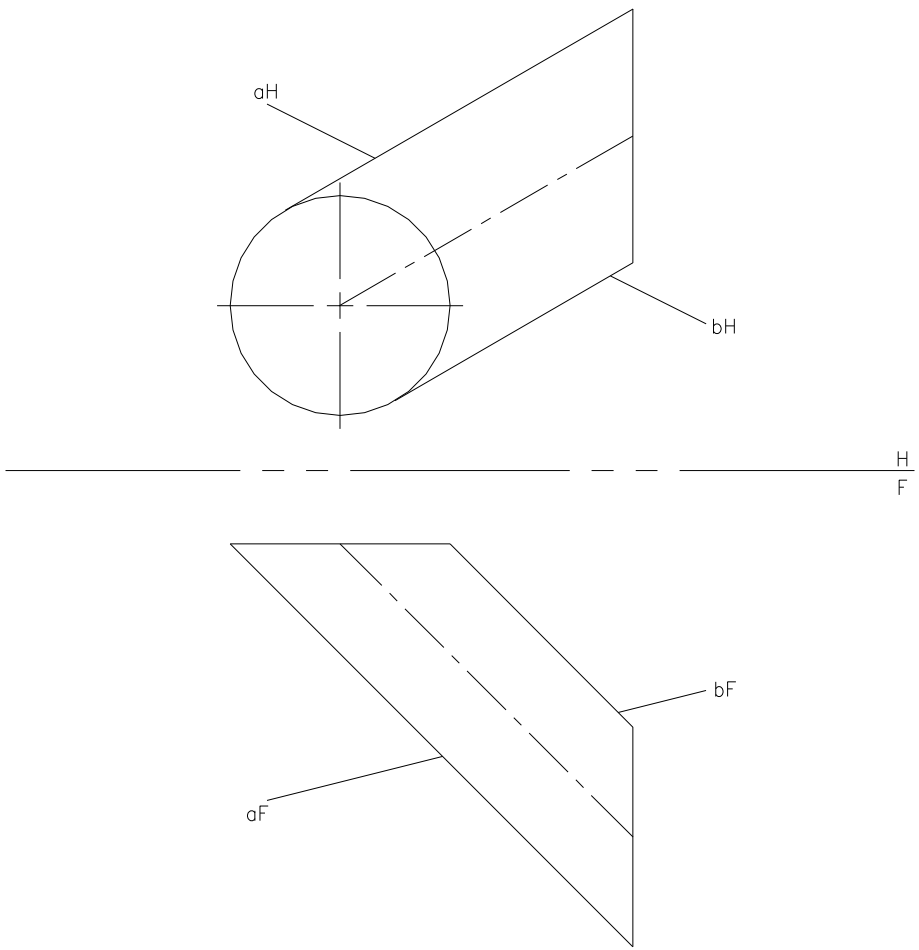


Intersection of Line with Cylinder



Front and top views of an Oblique cylinder is seen

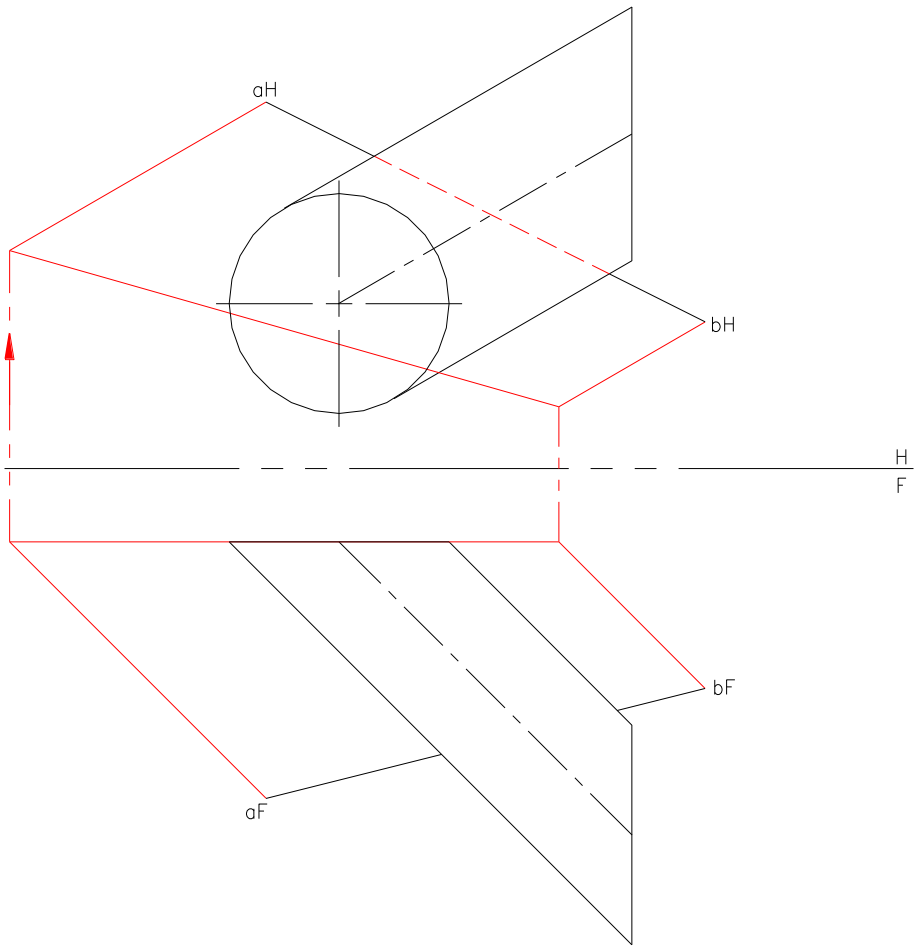
Intersection of Line with Cylinder



Front and top views of an Oblique cylinder is seen

a b is the line that passes through the cylinder and we have to locate the piercing points to find the line of intersection

Intersection of Line with Cylinder

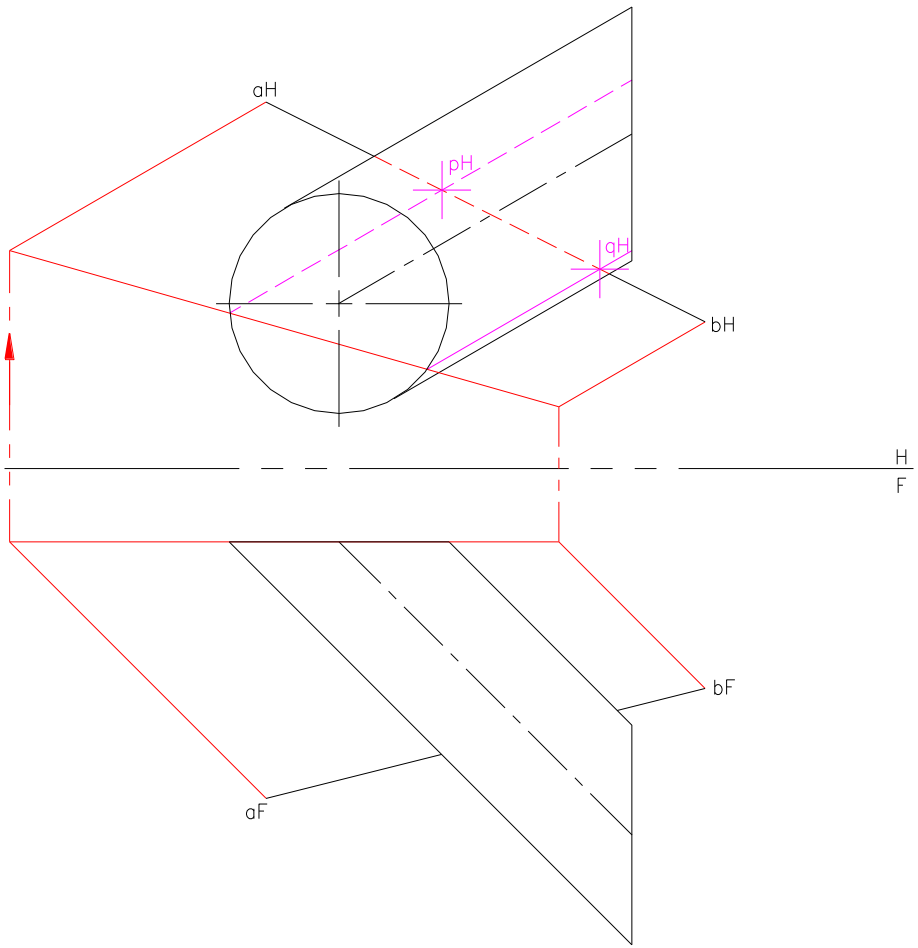


Front and top views of an Oblique cylinder is seen

a b is the line that passes through the cylinder and we have to locate the piercing points to find the line of intersection

Construct a plane through AB || to the cylinder;

Intersection of Line with Cylinder



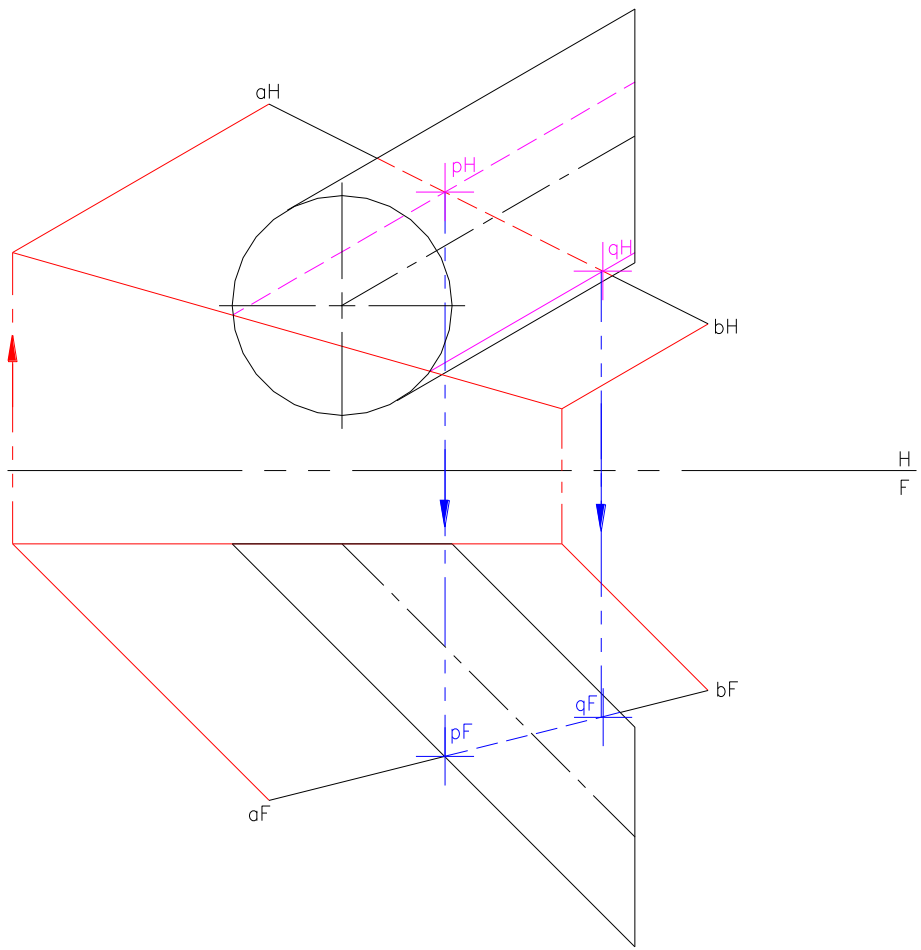
Front and top views of an Oblique cylinder is seen

a b is the line that passes through the cylinder and we have to locate the piercing points to find the line of intersection

Construct a plane through AB || to the cylinder;

Draw the cylinder elements ∈ to the plane.

Intersection of Line with Cylinder



Front and top views of an Oblique cylinder is seen

a b is the line that passes through the cylinder and we have to locate the piercing points to find the line of intersection

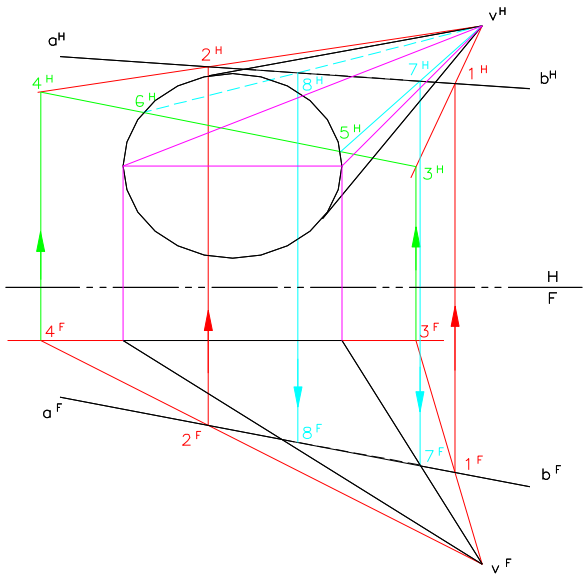
Construct a plane through AB || to the cylinder;

Draw the cylinder elements ∈ to the plane.

Trace P and Q to Front view and mark lines according to visibility

Intersection of a line with a cylinder/cone

Ⓐ INTERSECTION OF A LINE WITH A CYLINDER/CONE.



Number	Name	Date	Assignment
LOGT03			

Imagine a cutting plane that passes through the line and vertex of the cone; two lines of that plane will intesect AB and the base plane at points 1, 2, 3, 4.

Determine the position of the lines in the Horizontal view by locating points 1 and 2.

Find the intersection of the forementioned cutting plane and the base plane of the cone.

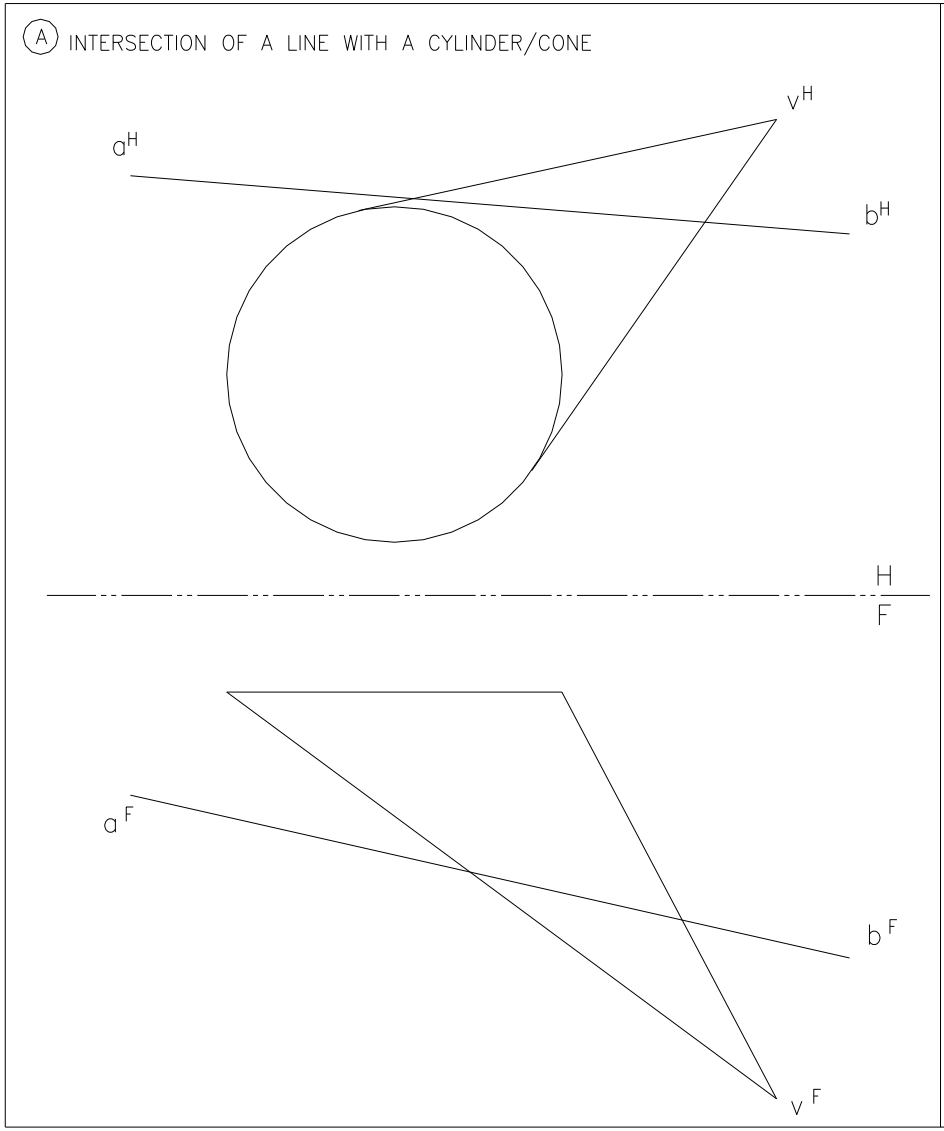
Points 5 and 6 define the elements of the cone through which the cutting plane passes;
7 and 8 are the points of intersection between line AB and the cone since they belong both to the cone and the line AB.

To see the line in correct visibility turn off layer A1 and turn on CORRECTA1.

Magenta lines show the extreme elements of the cone beyond which we cannot see on the Frontal view.

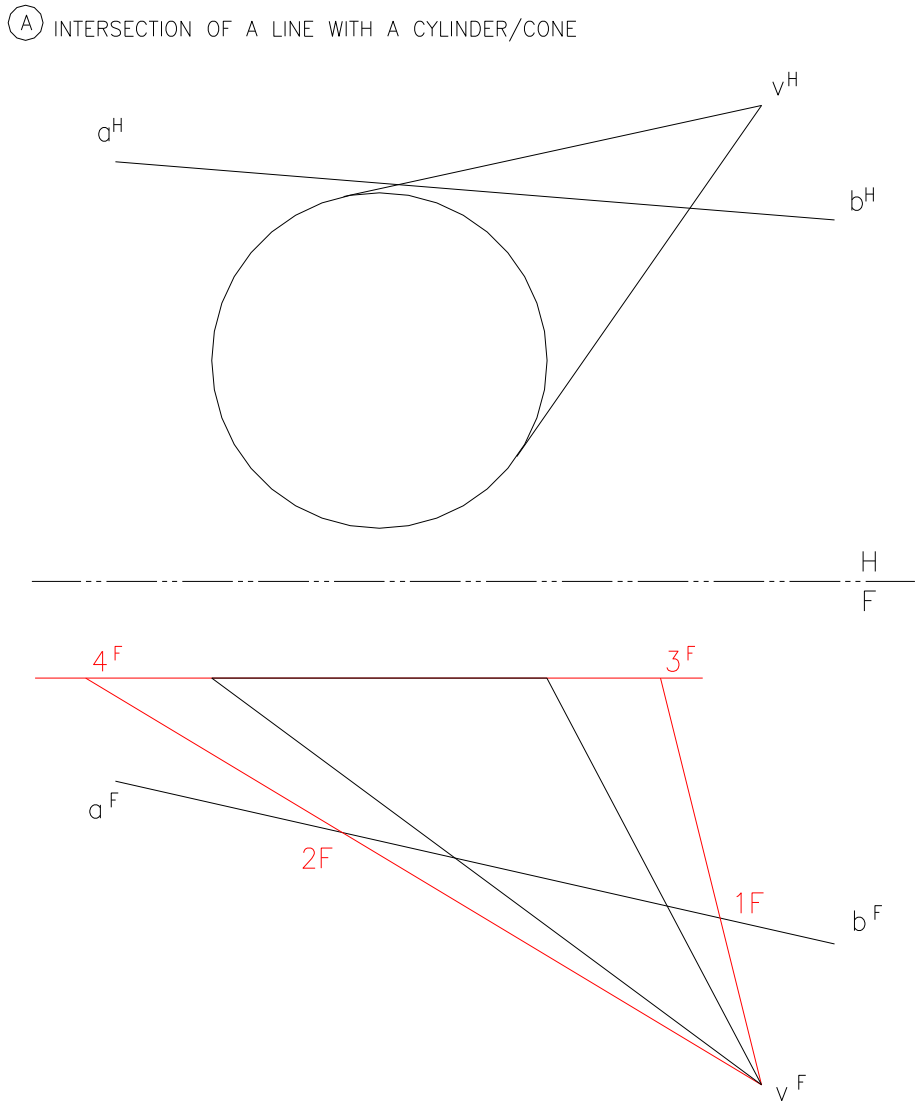
Number	Name	Date	Assignment
LOGT03			

Intersection of Line with Cone



a b is the line that intersects the oblique cone with vertex at V to find the intersection of the line with the cone, we must find the piercing points and join them.

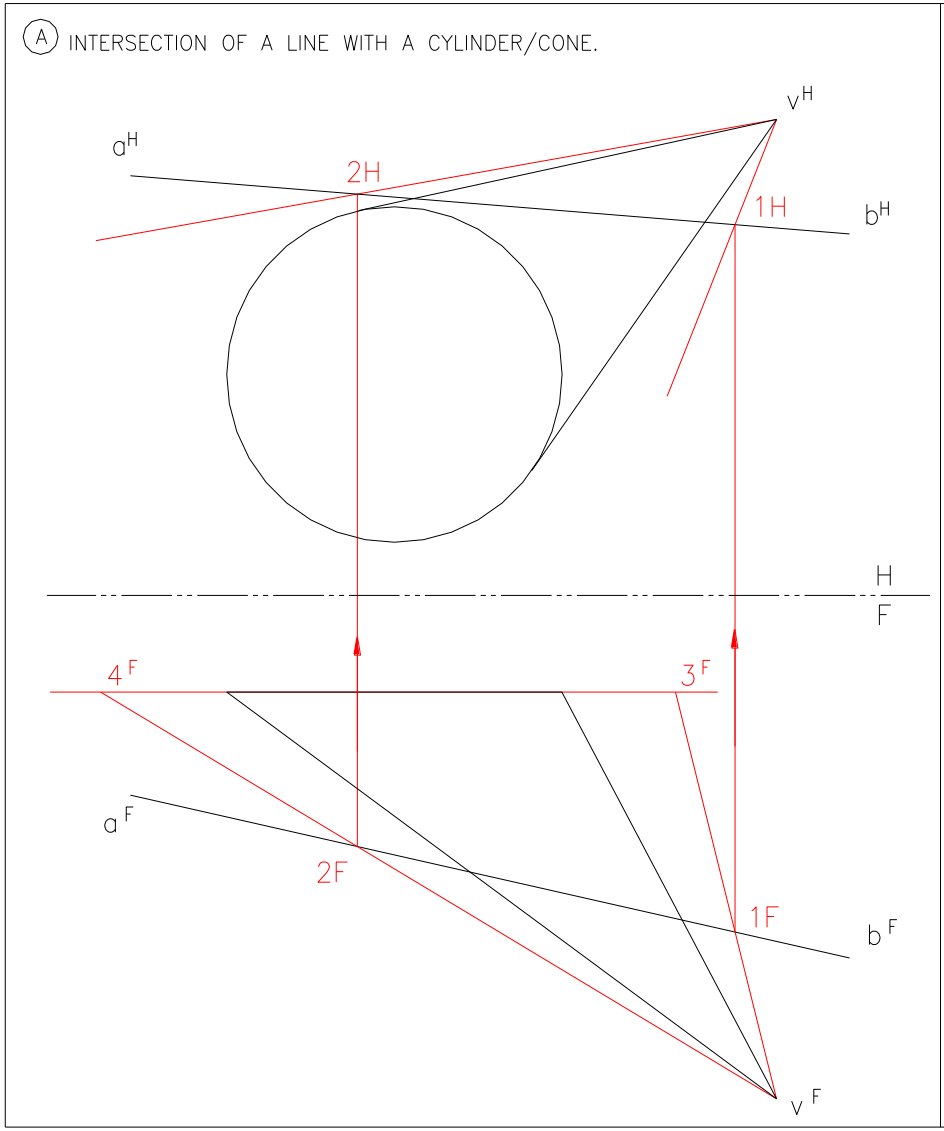
Intersection of Line with Cone



a b is the line that intersects the oblique cone with vertex at V to find the intersection of the line with the cone, we must find the piercing points and join them.

Imagine a cutting plane that passes through the line and vertex of the cone; two lines of that plane will intesect AB and the base plane at points 1, 2, 3, 4.

Intersection of Line with Cone

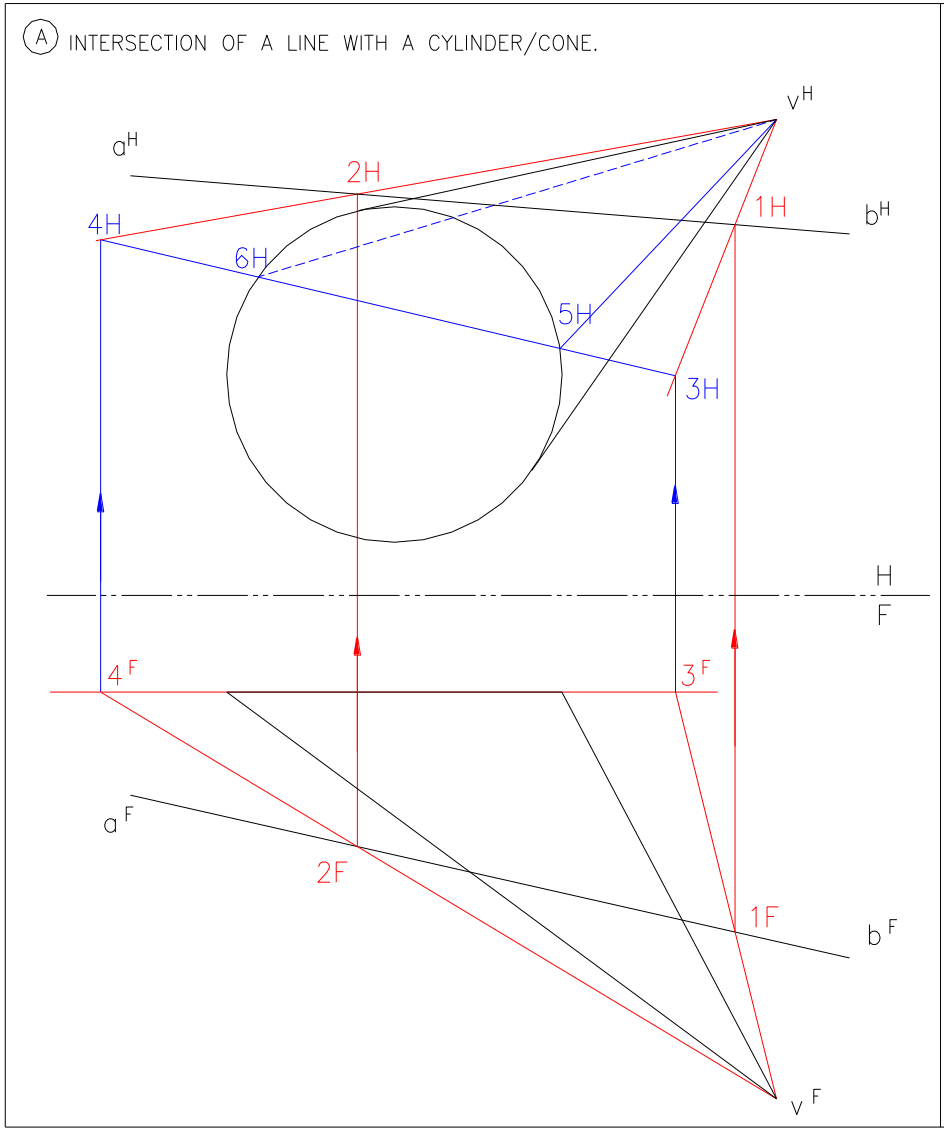


a b is the line that intersects the oblique cone with vertex at V. to find the intersection of the line with the cone, we must find the piercing points and join them.

Imagine a cutting plane that passes through the line and vertex of the cone; two lines of that plane will intesect AB and the base plane at points 1, 2, 3, 4.

Determine the position of the lines in the Horizontal view by locating points 1 and 2.

Intersection of Line with Cone



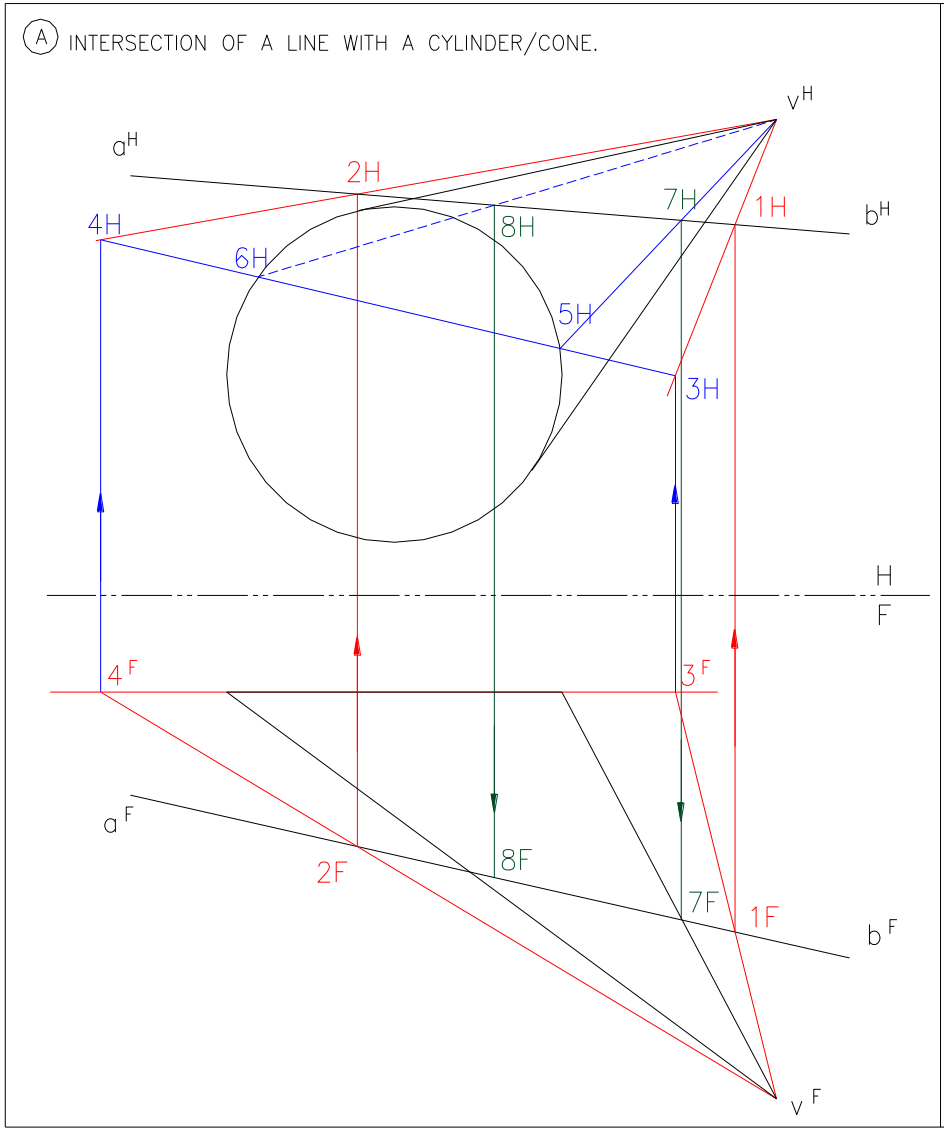
a b is the line that intersects the oblique cone with vertex at V. to find the intersection of the line with the cone, we must find the piercing points and join them.

Imagine a cutting plane that passes through the line and vertex of the cone; two lines of that plane will intesect AB and the base plane at points 1, 2, 3, 4.

Determine the position of the lines in the Horizontal view by locating points 1 and 2.

Find the intersection of the forementioned cutting plane and the base plane of the cone. Points 5 and 6 define the elements of the cone through which the cutting plane passes;

Intersection of Line with Cone



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Imagine a cutting plane that passes through the line and vertex of the cone; two lines of that plane will intesect AB and the base plane at points 1, 2, 3, 4.

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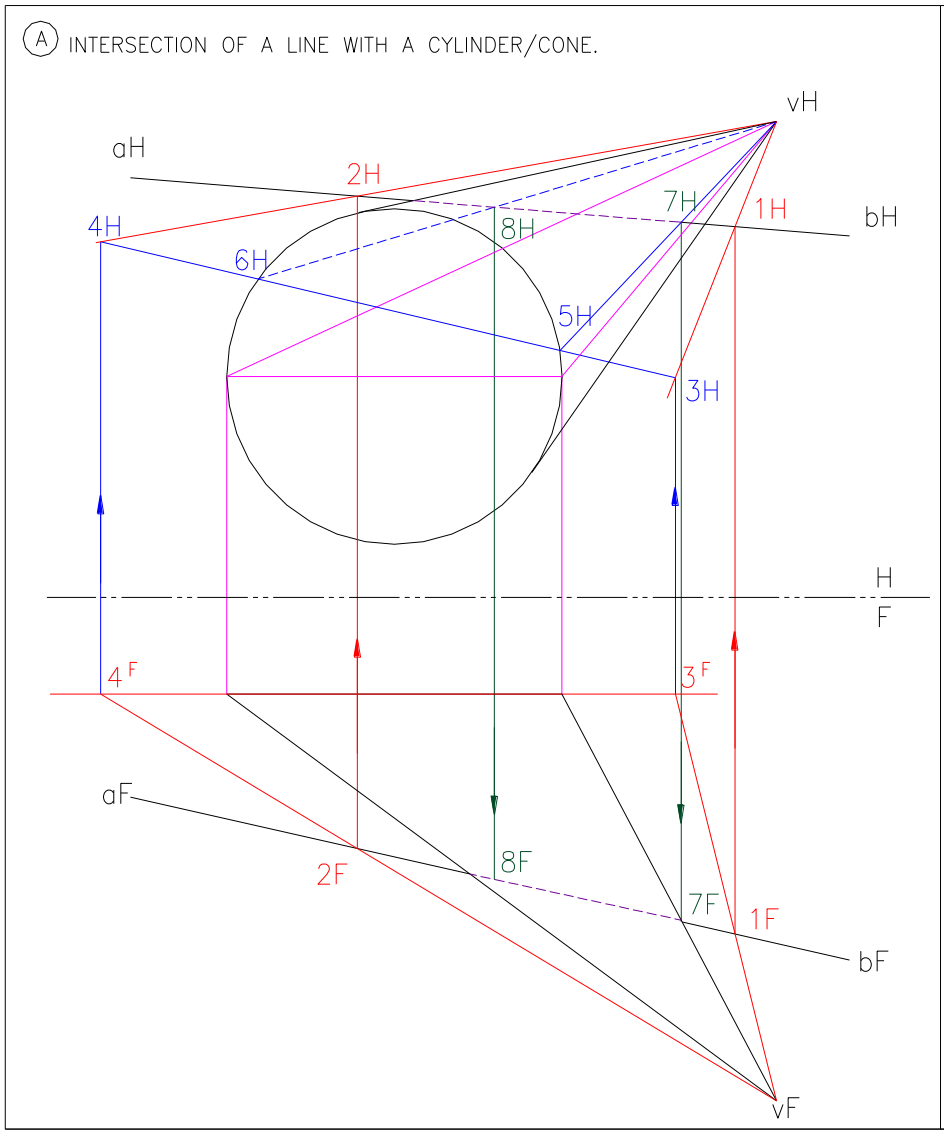
7 and 8 are the points of intersection between line AB and the cone since they belong both to the cone and the line AB.

Intersection of Line with Cone



a b is the line that intersects the oblique cone with vertex at V. to find the intersection of the line with the cone, we must find the piercing points and join them.

Imagine a cutting plane that passes through the line and vertex of the cone; two lines of that plane will intesect AB and the base plane at points 1, 2, 3, 4.

Determine the position of the lines in the Horizontal view by locating points 1 and 2.

Find the intersection of the forementioned cutting plane and the base plane of the cone. Points 5 and 6 define the elements of the cone through which the cutting plane passes;

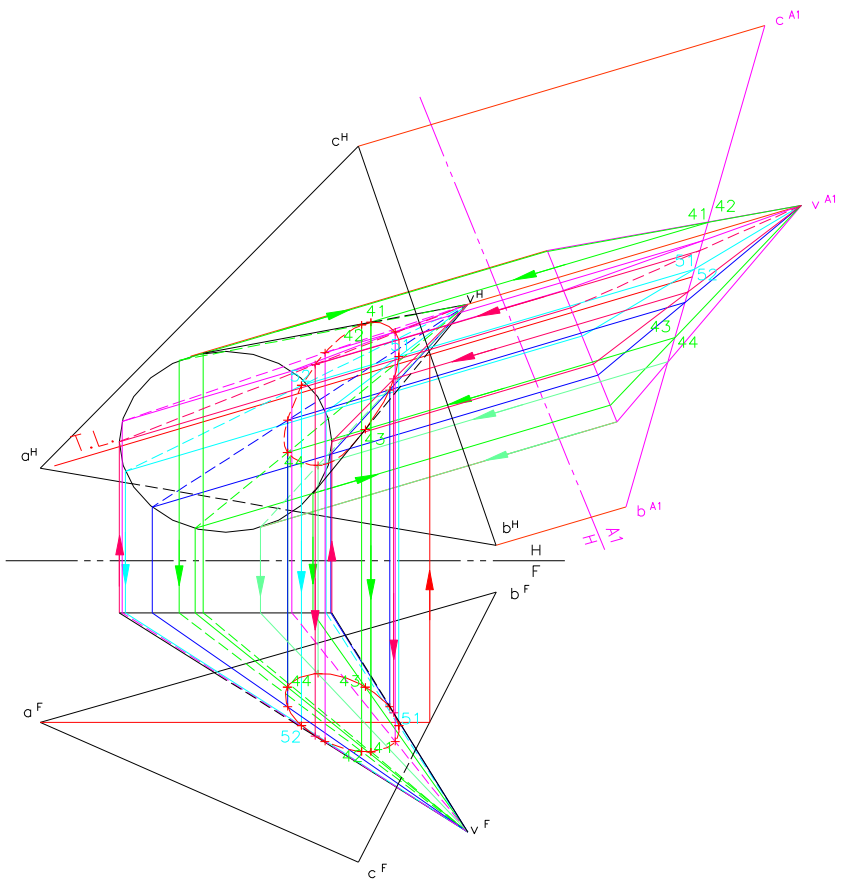
7 and 8 are the points of intersection between line AB and the cone since they belong both to the cone and the line AB.

Visibility of the lines are shown in 'this color

Magenta lines show the extreme elements of the cone beyond which we cannot see on the Frontal view.

Intersection of a plane with a cylinder/cone

INTERSECTION OF A PLANE WITH A CYLINDER/CONE.



Number	Name	Date	Assignment
L06T02			

This drawing is very dense; related layers have same color and number (for example: A6C, B6C)

LEGEND FOR LAYER CONTROL:
A* – pertains to horizontal view
B* – pertains to frontal view
*C – construction
*TXT – contains text
TURN OFF the Construction layers (for example: A5C, B5C, etc.) once studied;

The frontal and horizontal section curves are contained on SECTIONF and SECTIONH layers respectively.
In a view where the plane is seen as an edge we can define the points of intersection of the plane with the cone and trace them to the principal views.
The direction of sight for such view is determined along the T.L..

To determine horizontal visibility of the intersection line bring the extreme lines of the cone from the horizontal view to the auxiliary view; trace back the points of intersection.

The visibility changes at the intersection points on the extreme lines;

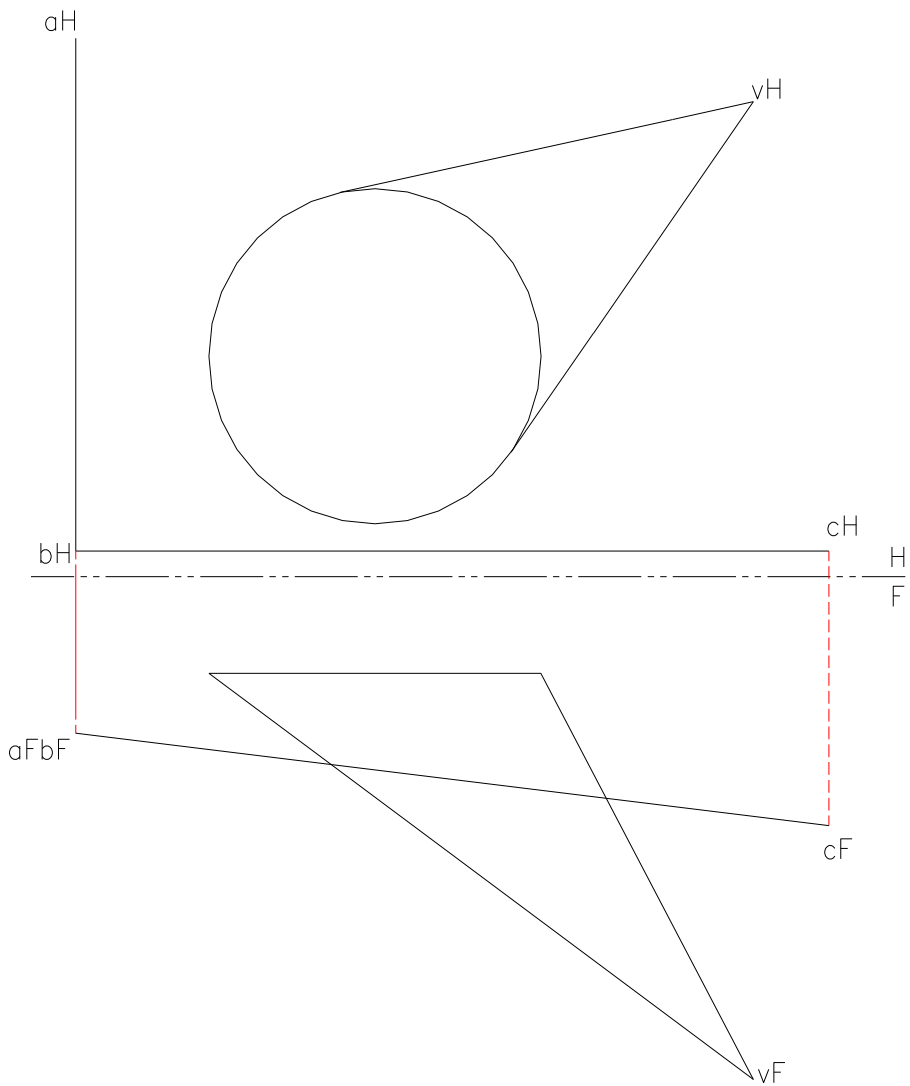
This is A4CVISIBILITY layer; turn on B4C to trace the points further.

Points 51 and 52 of the intersection line belong to the cyan lines on the surface of the cone and are traced accordingly. See also B5C layer.

To determine frontal visibility bring the extreme lines of the cone from the frontal view to the horizontal (and then to the auxiliary view for accuracy); trace back the points of intersection.

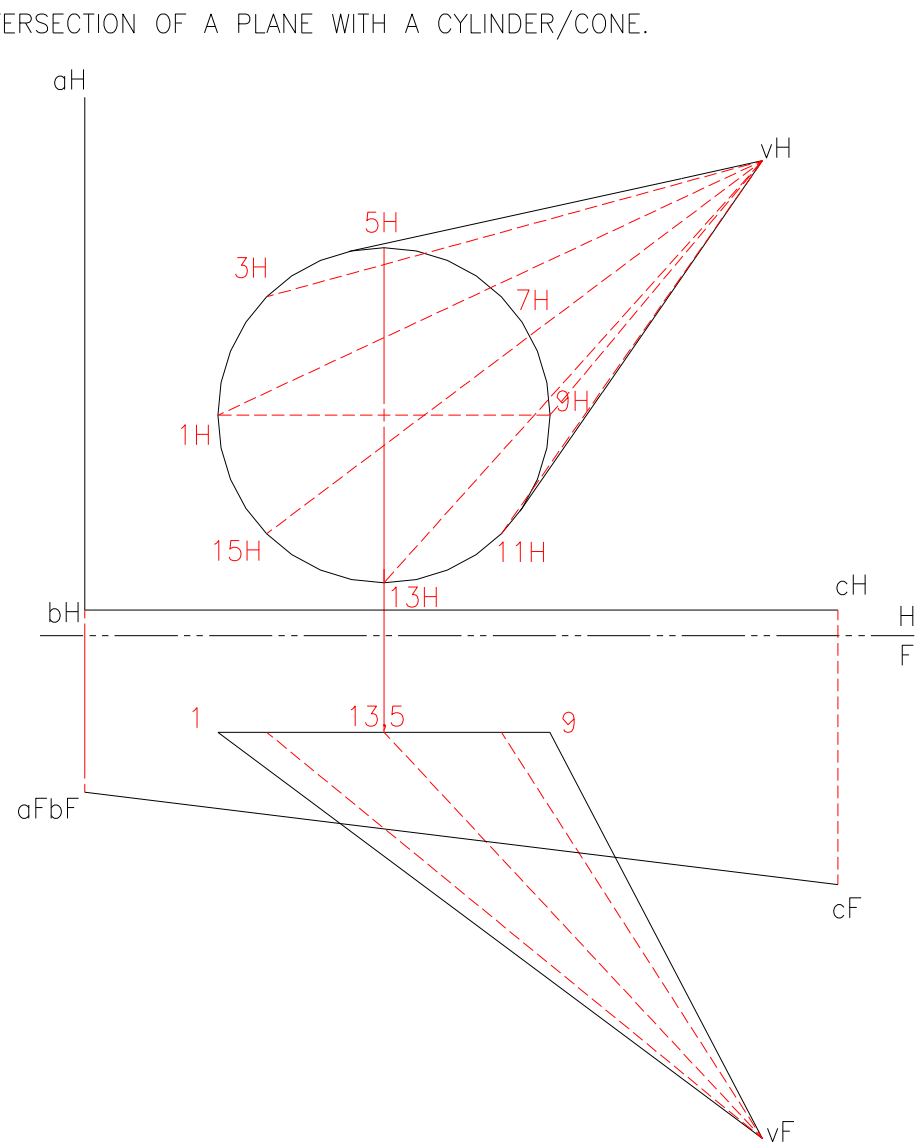
Number	Name	Date	Assignment
L06T02			

Intersection of Plane with Cone/Cylinder



abc is the plane that intersects the oblique cone with vertex in V. For this multiple points are needed to get the curved surface accurately

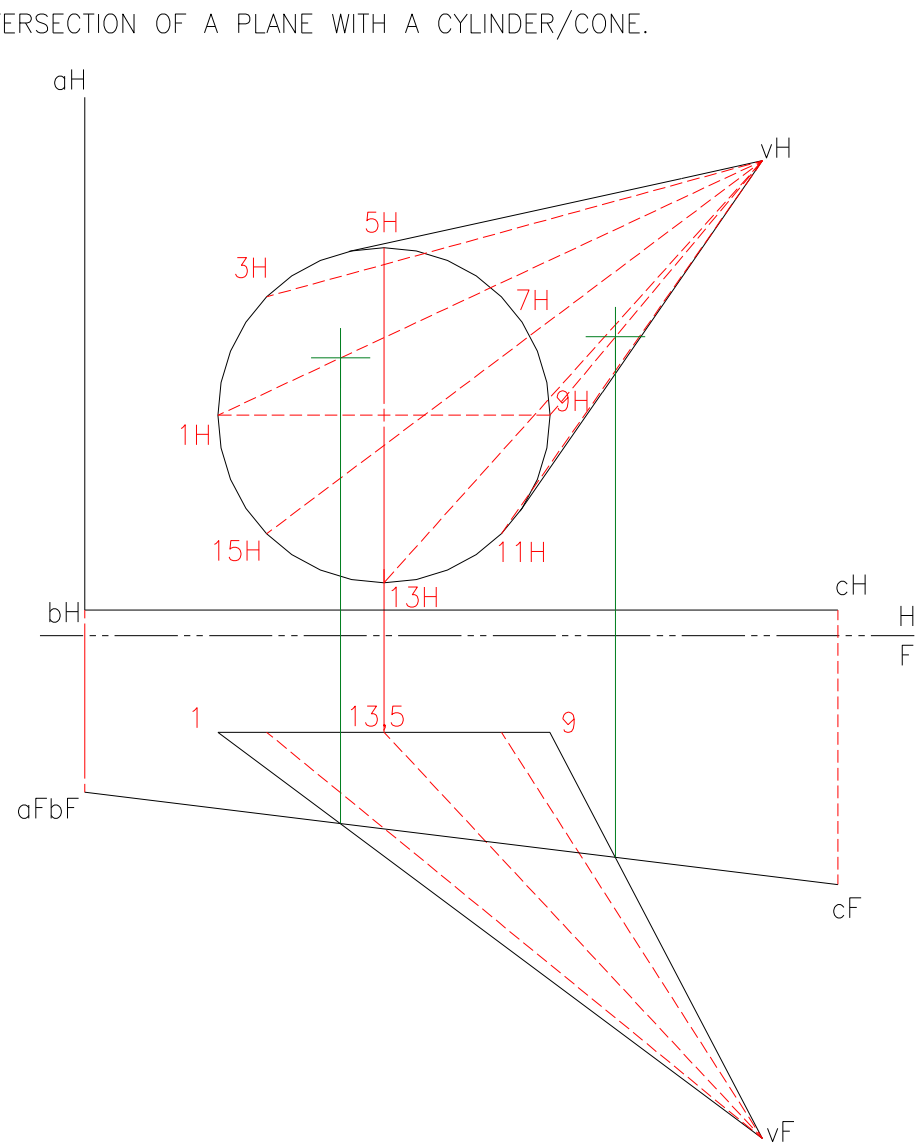
Intersection of Plane with Cone/Cylinder



abc is the plane that intersects the oblique cone with vertex in V. For this multiple points are needed to get the curved surface accurately

the points are done on the circle and projected to the FV where the line elements are drawn to the vertex

Intersection of Plane with Cone/Cylinder

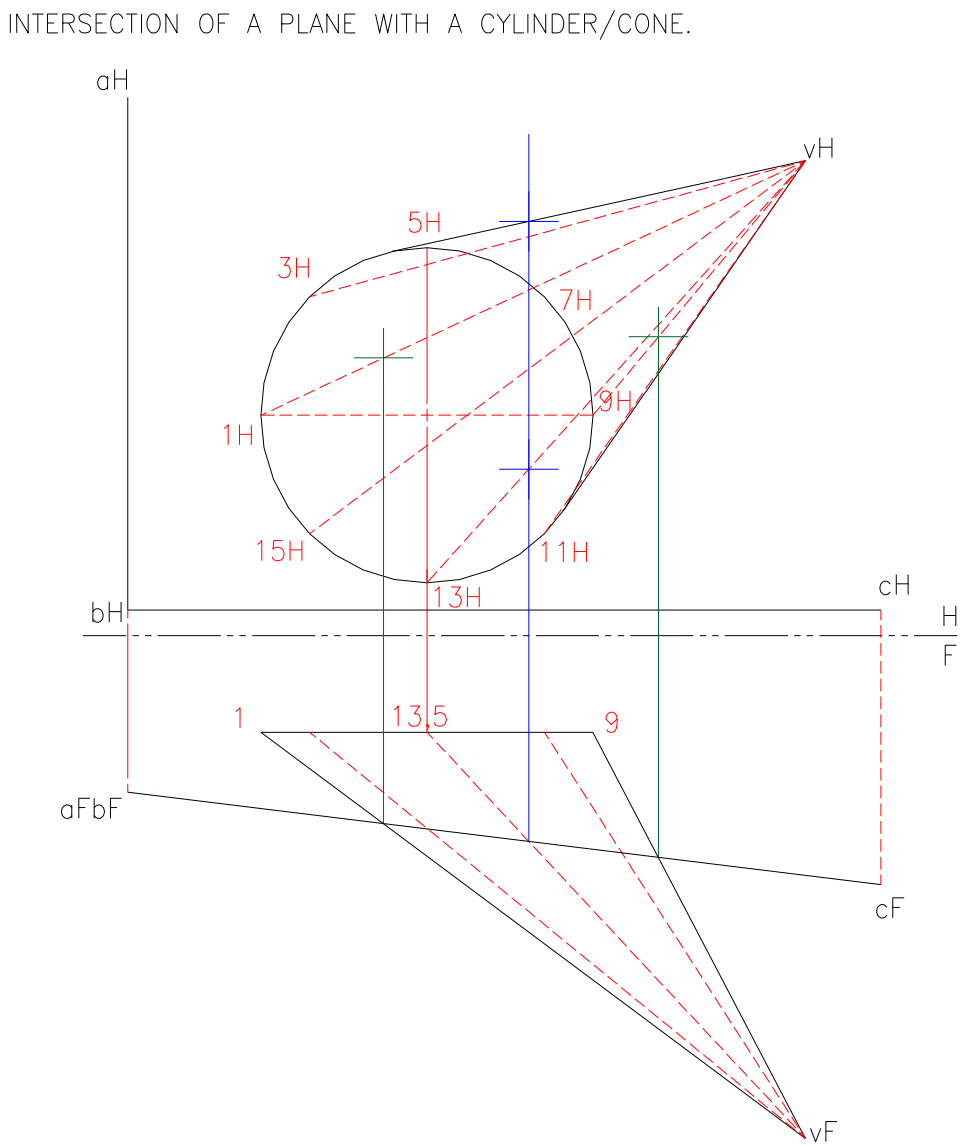


abc is the plane that intersects the oblique cone with vertex in V. For this multiple points are needed to get the curved surface accurately

the points are done on the circle and projected to the FV where the line elements are drawn to the vertex

project the piercing point of EV of plane on the cone in extreme line 1V and 9V in the FV back to same lines in TV

Intersection of Plane with Cone/Cylinder



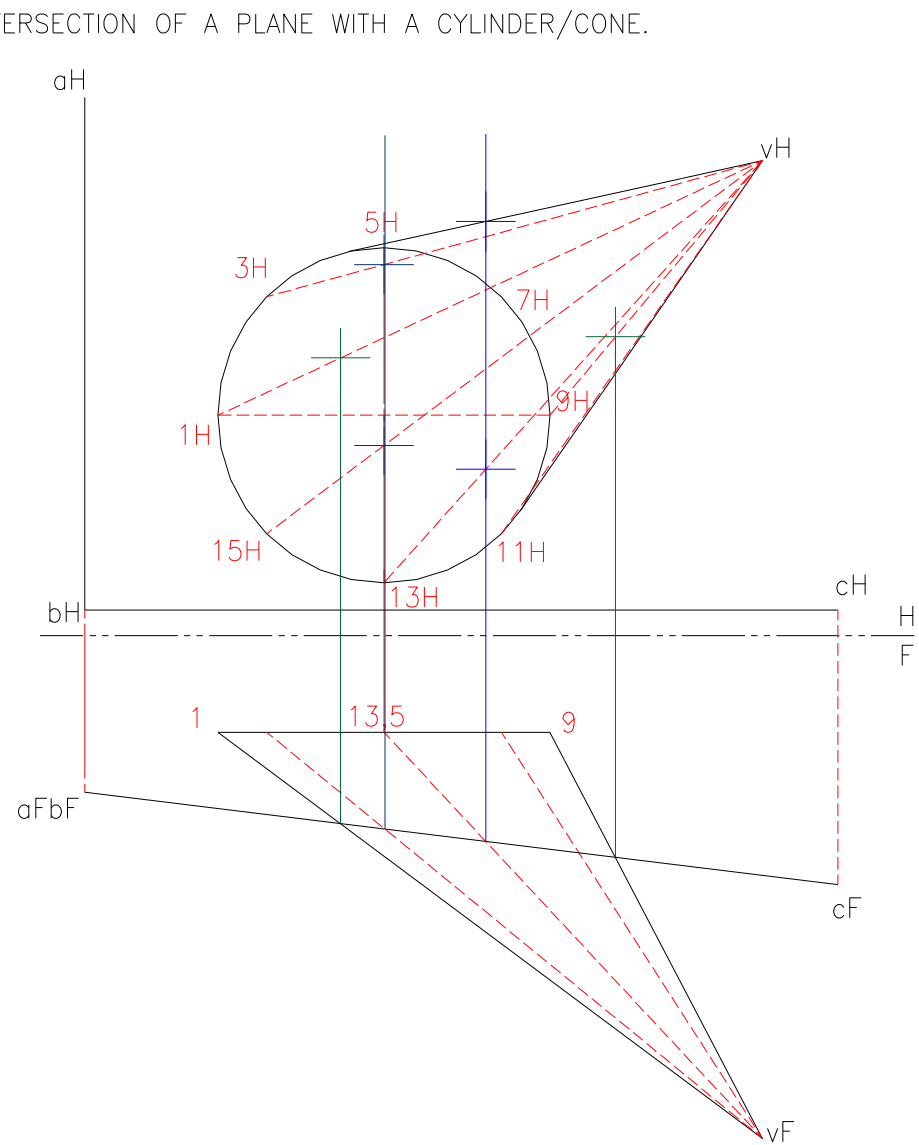
abc is the plane that intersects the oblique cone with vertex in V. For this multiple points are needed to get the curved surface accurately

the points are done on the circle and projected to the FV where the line elements are drawn to the vertex

project the piercing point of EV of plane on the cone in extreme line 1V and 9V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 13V and 5V in the FV back to same lines in TV

Intersection of Plane with Cone/Cylinder



abc is the plane that intersects the oblique cone with vertex in V. For this multiple points are needed to get the curved surface accurately

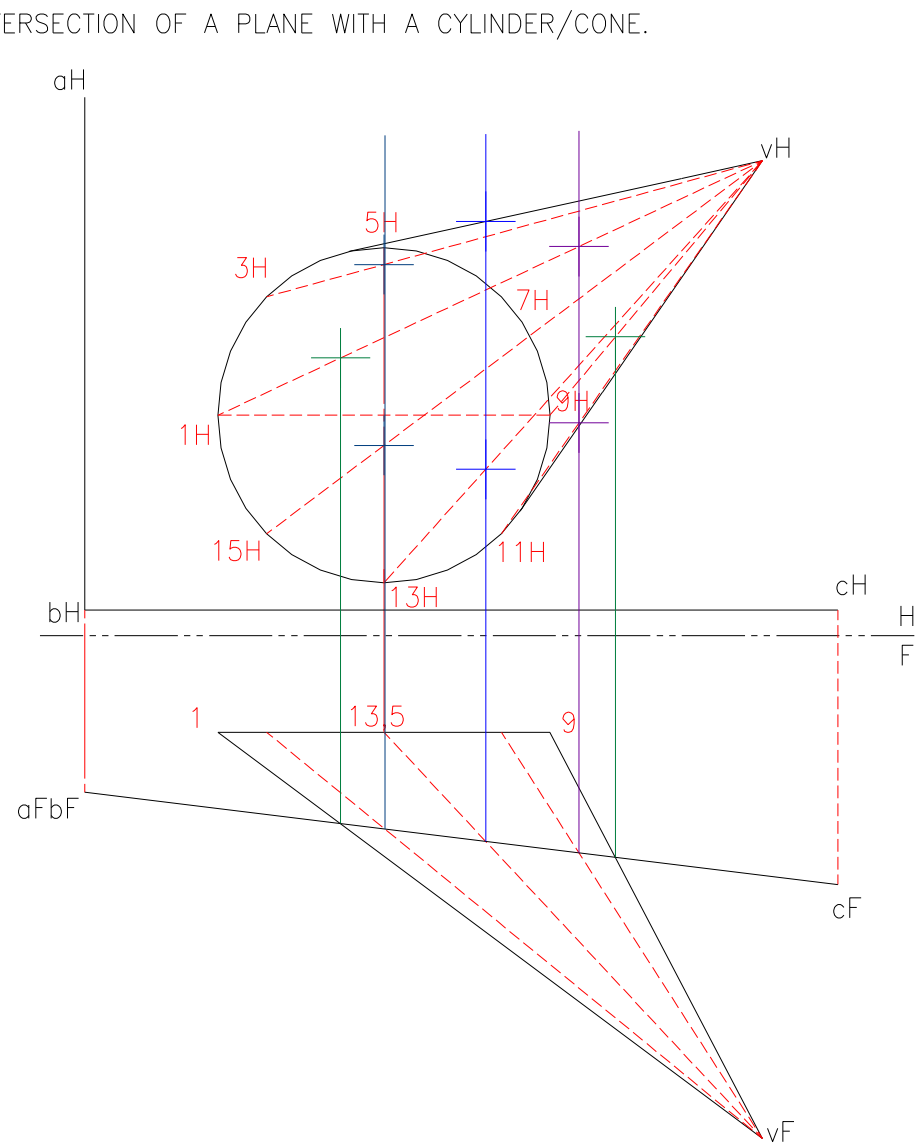
the points are done on the circle and projected to the FV where the line elements are drawn to the vertex

project the piercing point of EV of plane on the cone in extreme line 1V and 9V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 13V and 5V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 3V and 15V in the FV back to same lines in TV

Intersection of Plane with Cone/Cylinder



abc is the plane that intersects the oblique cone with vertex in V. For this multiple points are needed to get the curved surface accurately

the points are done on the circle and projected to the FV where the line elements are drawn to the vertex

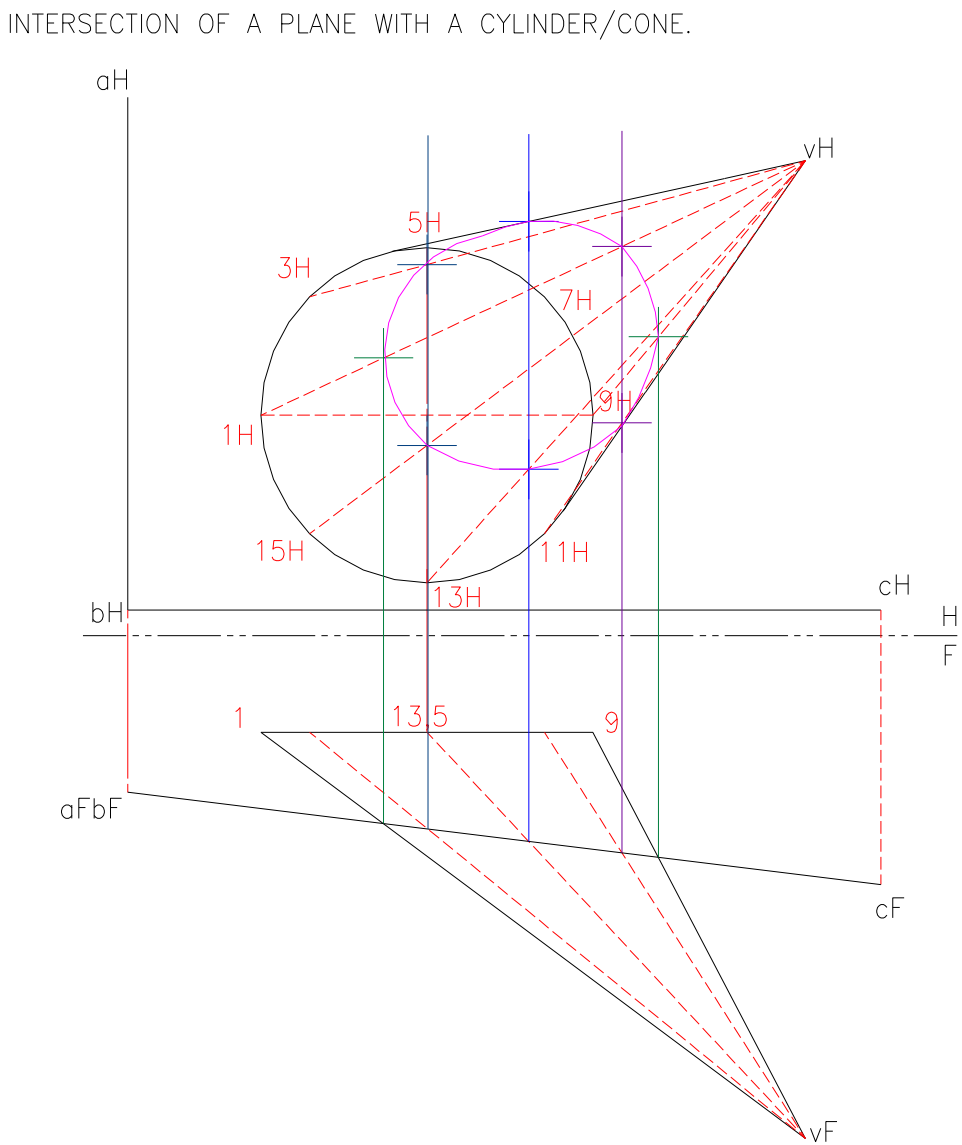
project the piercing point of EV of plane on the cone in extreme line 1V and 9V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 13V and 5V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 3V and 15V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 7V and 11V in the FV back to same lines in TV

Intersection of Plane with Cone/Cylinder



abc is the plane that intersects the oblique cone with vertex in V. For this multiple points are needed to get the curved surface accurately

the points are done on the circle and projected to the FV where the line elements are drawn to the vertex

project the piercing point of EV of plane on the cone in extreme line 1V and 9V in the FV back to same lines in TV

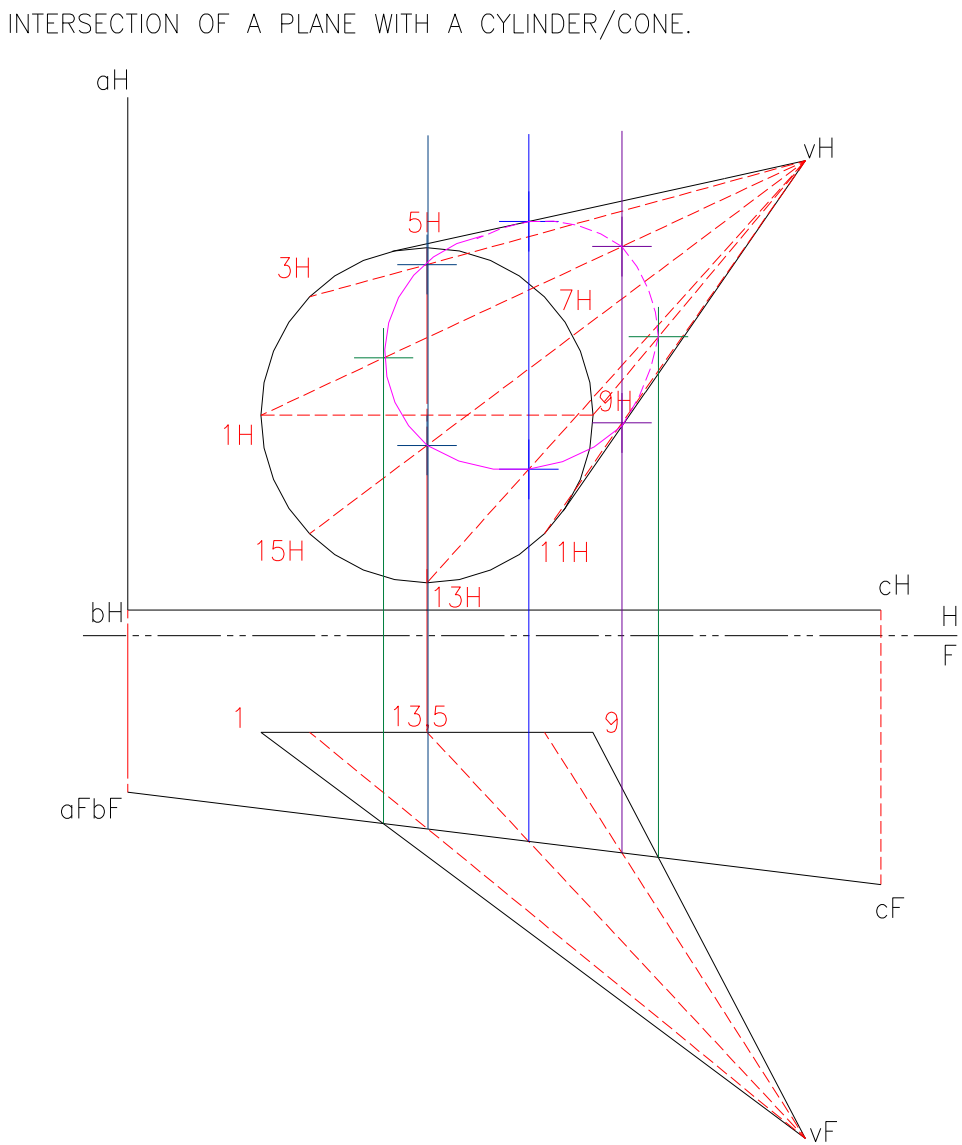
project the piercing point of EV of plane on the cone in line 13V and 5V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 3V and 15V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 7V and 11V in the FV back to same lines in TV

with available points, draw a curve with irregular curves. the more no. of points, the smooth the curve is.

Intersection of Plane with Cone/Cylinder



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the points are done on the circle and projected to the FV where the line elements are drawn to the vertex

project the piercing point of EV of plane on the cone in extreme line 1V and 9V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 13V and 5V in the FV back to same lines in TV

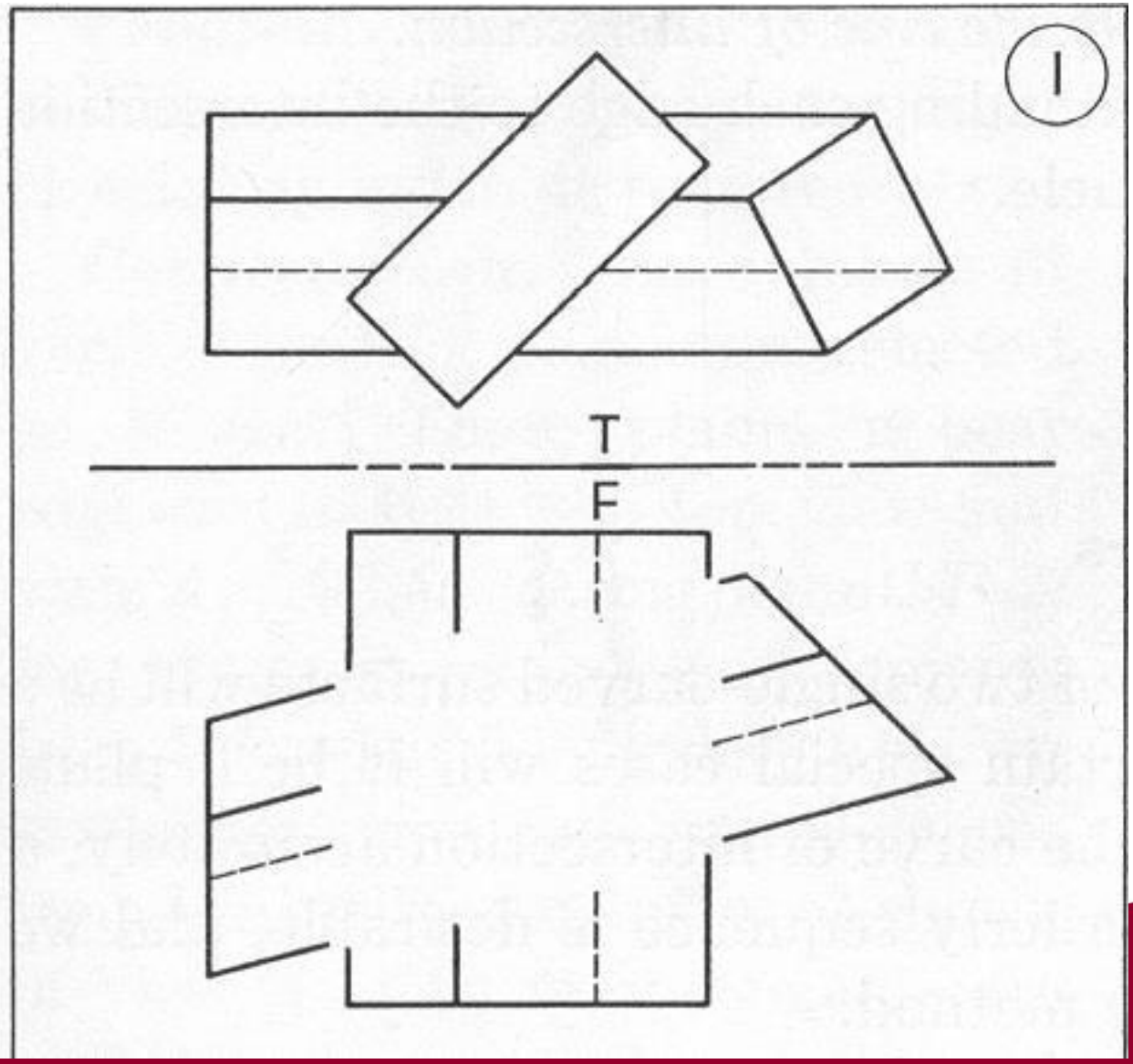
project the piercing point of EV of plane on the cone in line 3V and 15V in the FV back to same lines in TV

project the piercing point of EV of plane on the cone in line 7V and 11V in the FV back to same lines in TV

with available points, draw a curve with irregular curves. the more no. of points, the smooth the curve is.

Look for Visibility

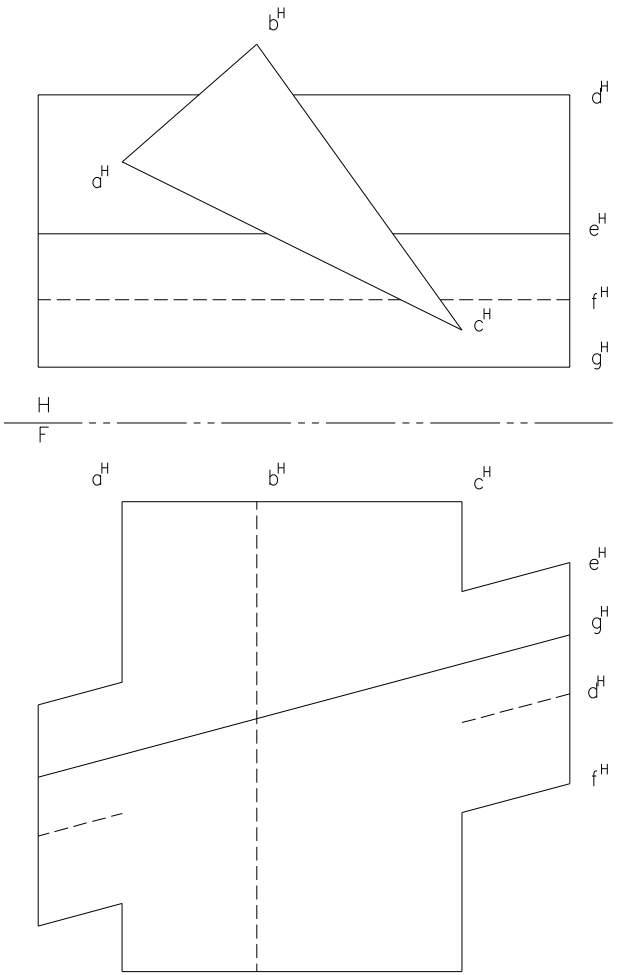
Intersection of two Prisms



Cutting plane method

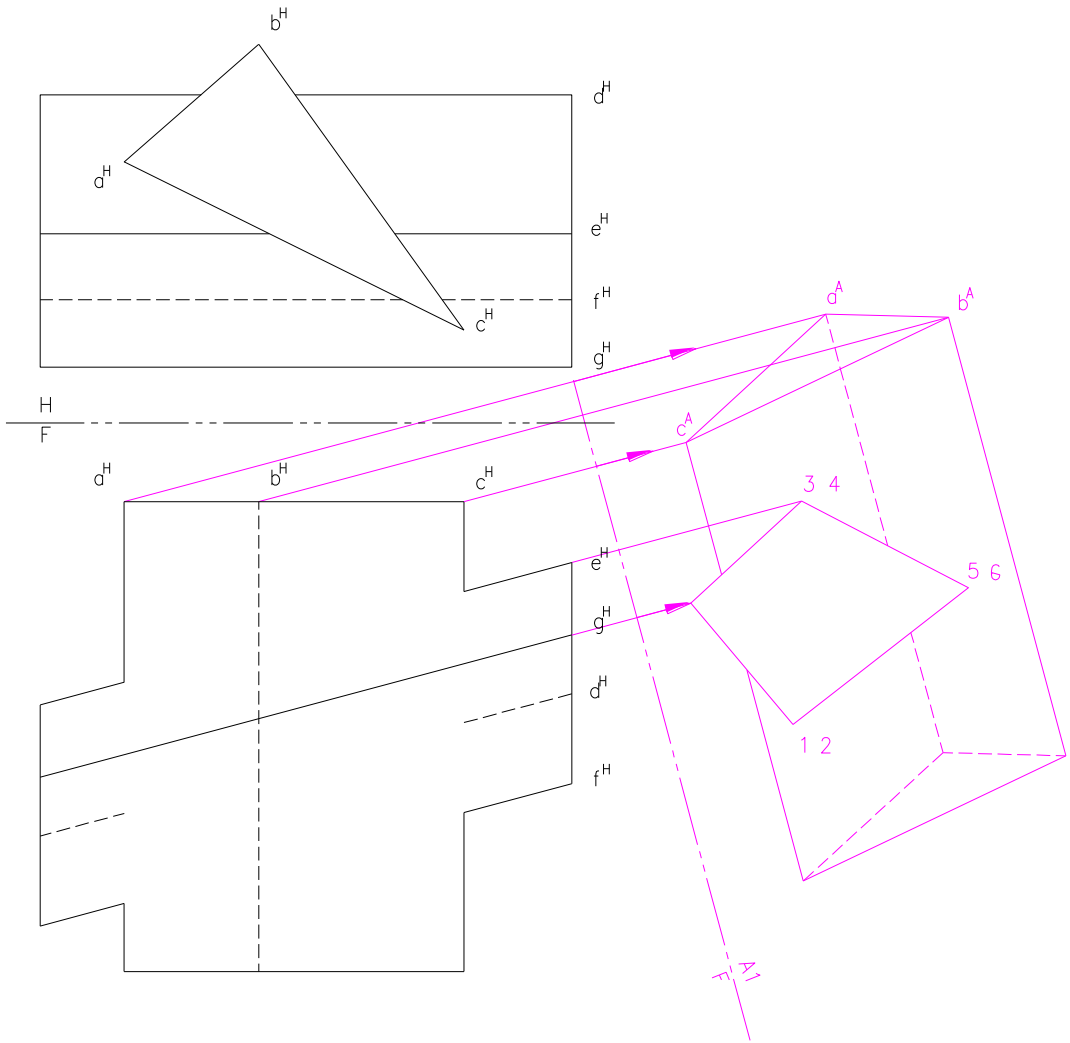
The problem shows one vertical and one inclined prism, we must find the intersection figures

Intersection of two Prisms



A vertical prism is intersected by a inclined prism. how will the intersection lines be

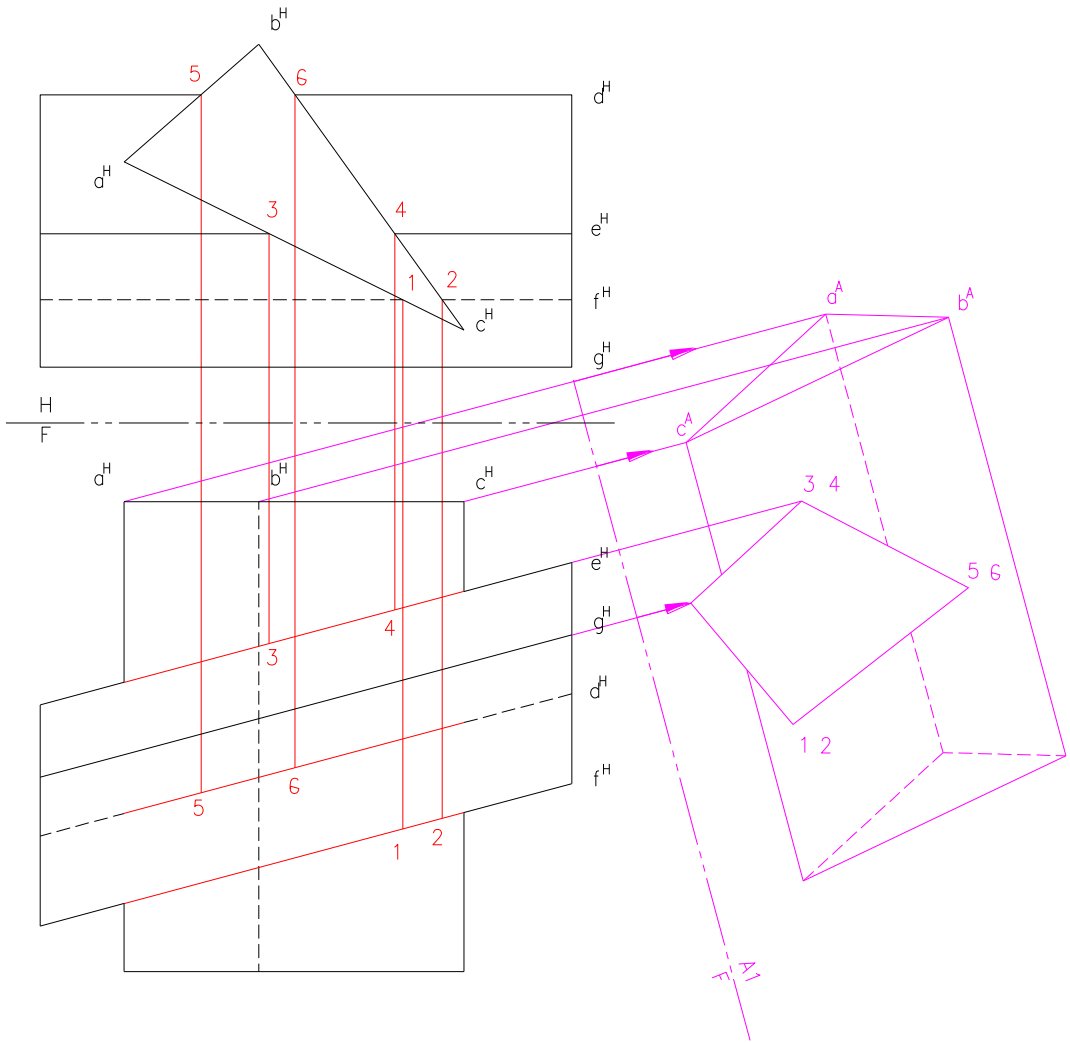
Intersection of two Prisms



A vertical prism is intersected by a inclined prism. how will the intersection lines be

The lateral edge of the veritcal prism is seen as EV in the front view. To see the lateral surface of the inclined prism, an aux view is drawn

Intersection of two Prisms

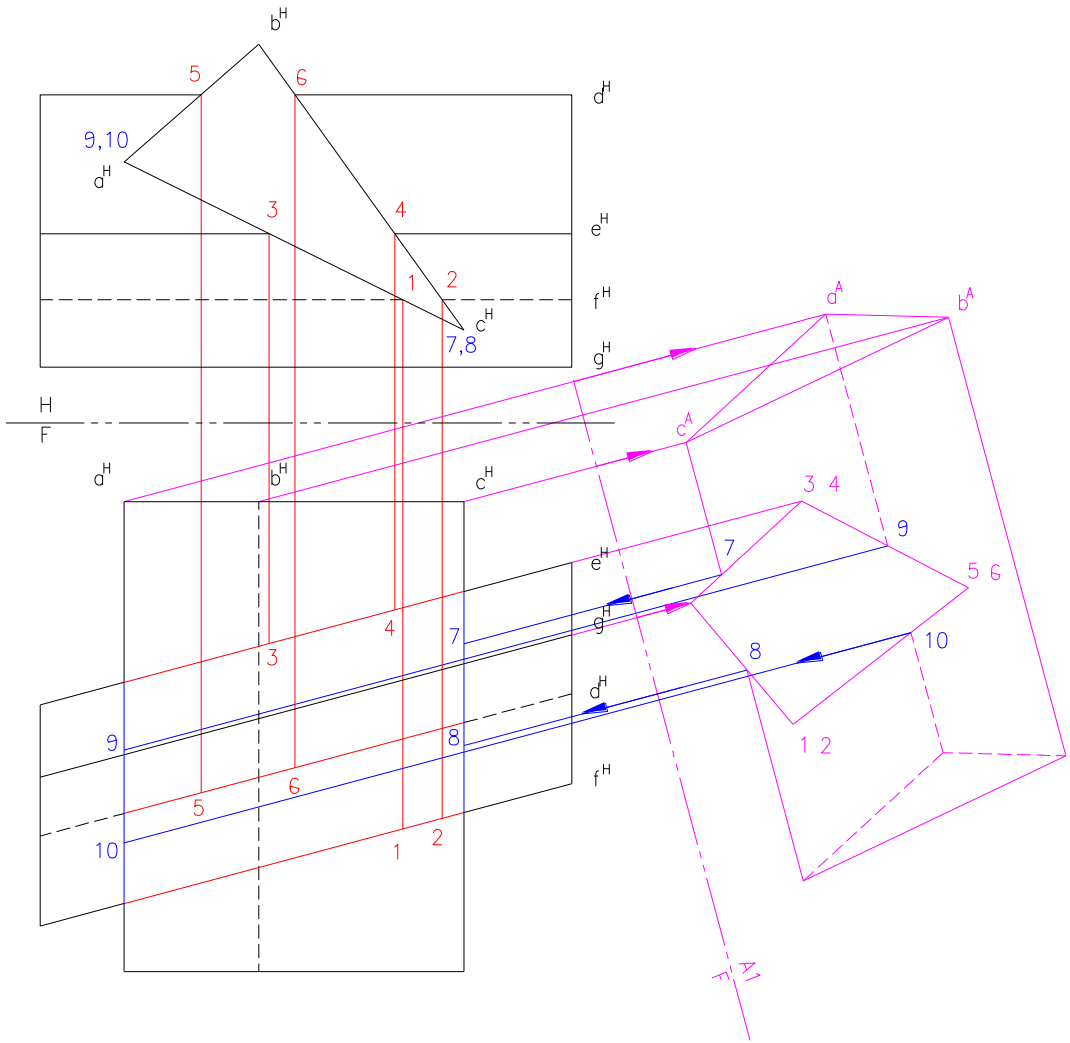


A vertical prism is intersected by a inclined prism. how will the intersection lines be

The lateral edge of the veritcal prism is seen as EV in the front view. To see the lateral surface of the inclined prism, an aux view is drawn

The number of the edges in aux view come from the points of intersection of the vertical prism with the edges of the inclined prism in the top view

Intersection of two Prisms



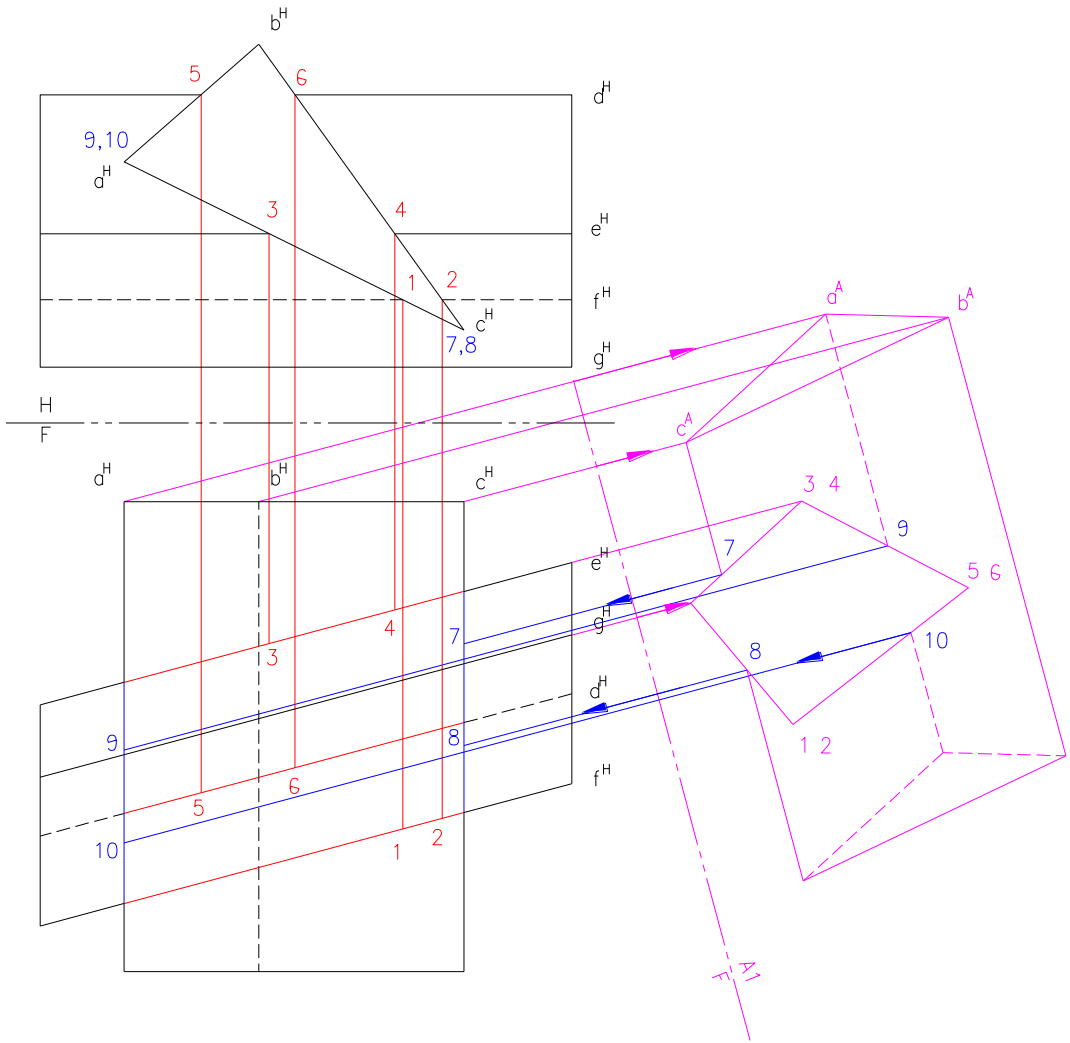
A vertical prism is intersected by a inclined prism. how will the intersection lines be

The lateral edge of the veritcal prism is seen as EV in the front view. To see the lateral surface of the inclined prism, an aux view is drawn

The number of the edges in aux view come from the points of intersection of the vertical prism with the edges of the inclined prism in the top view

Trace the points 7, 8, 9, 10 which show the face of the inclined prism intersecting the edges of the vertical prism, back to the front view.

Intersection of two Prisms



A vertical prism is intersected by a inclined prism. how will the intersection lines be

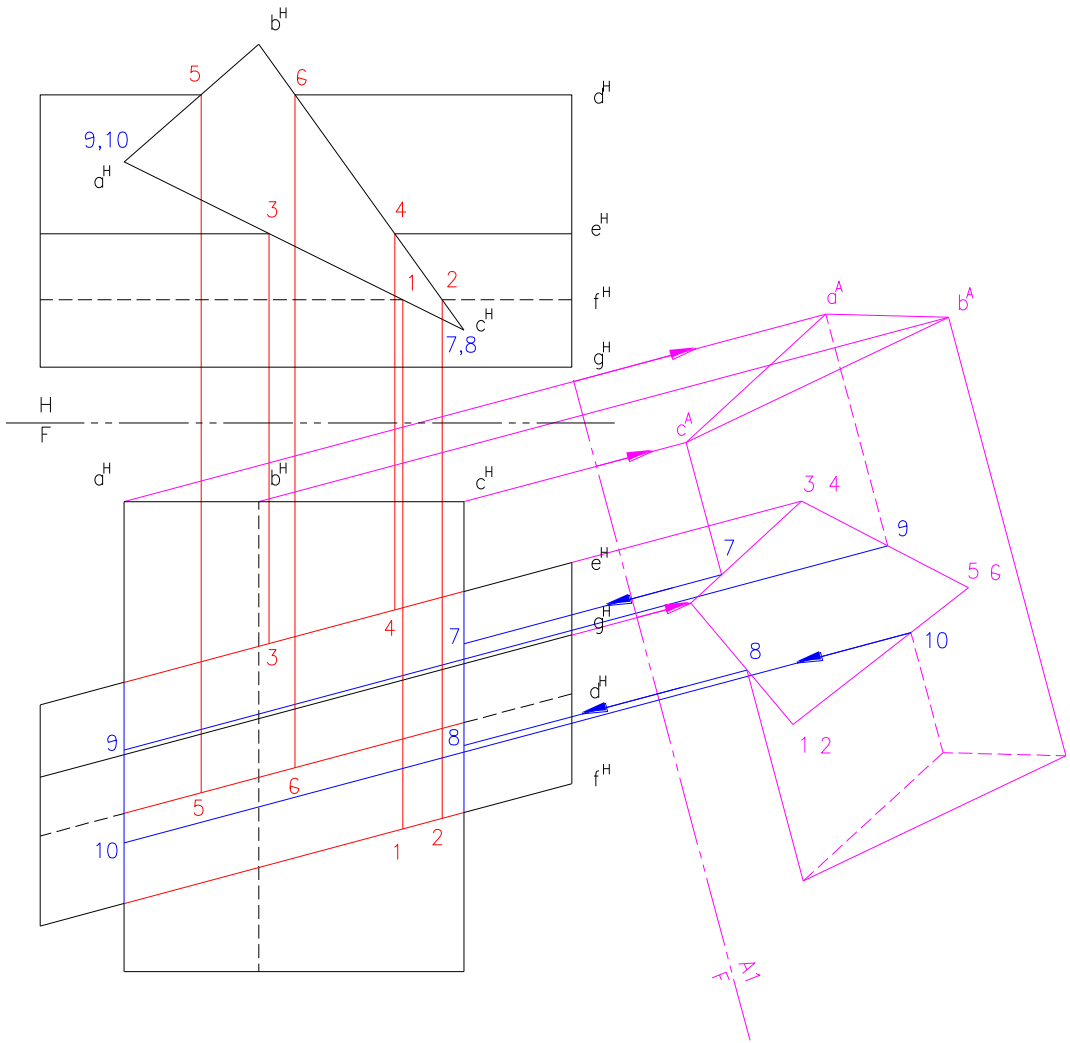
The lateral edge of the veritcal prism is seen as EV in the front view. To see the lateral surface of the inclined prism, an aux view is drawn

The number of the edges in aux view come from the points of intersection of the vertical prism with the edges of the inclined prism in the top view

Trace the points 7, 8, 9, 10 which show the face of the inclined prism intersecting the edges of the vertical prism, back to the front view.

To be visible in the front view, a point must lie on a visible edge of one prism and on a visible face of the other;
For example pt.1 is visible and pt.4 is hidden.
1, 3, 7, 8 visible

Intersection of two Prisms



A vertical prism is intersected by a inclined prism. how will the intersection lines be

The lateral edge of the veritcal prism is seen as EV in the front view. To see the lateral surface of the inclined prism, an aux view is drawn

The number of the edges in aux view come from the points of intersection of the vertical prism with the edges of the inclined prism in the top view

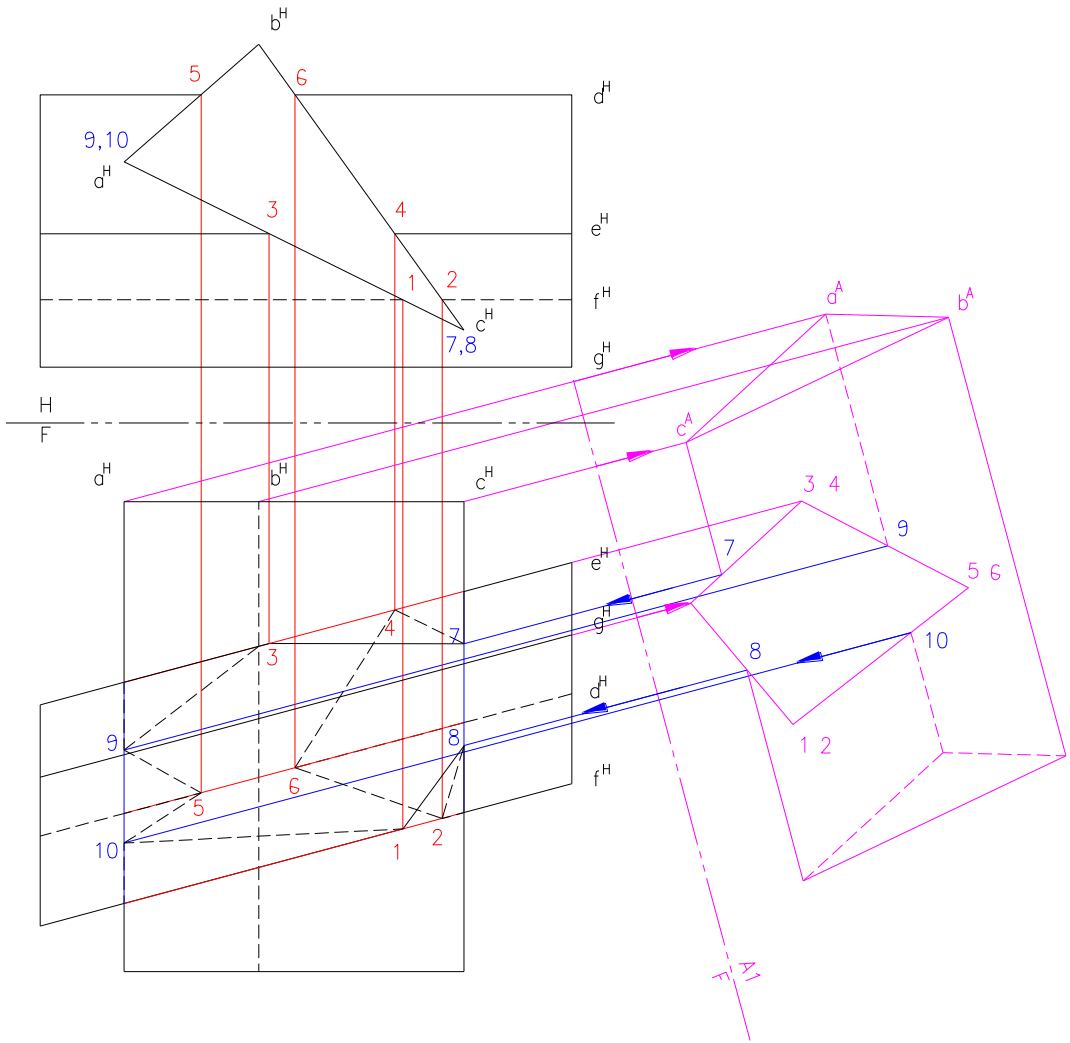
Trace the points 7, 8, 9, 10 which show the face of the inclined prism intersecting the edges of the vertical prism, back to the front view.

To be visible in the front view, a point must lie on a visible edge of one prism and on a visible face of the other;
For example pt.1 is visible and pt.4 is hidden.
1, 3, 7, 8 visible

Connecting the lines in proper sequence is the key to completion. The line should be traced around each prism in all views. like when you see in aux view there is a line from 3,4 to 9, but tin TV there is no line from 4 to 9.

So a line is drawn between 3 and 9 in front view

Intersection of two Prisms



A vertical prism is intersected by a inclined prism. how will the intersection lines be

The lateral edge of the veritcal prism is seen as EV in the front view. To see the lateral surface of the inclined prism, an aux view is drawn

The number of the edges in aux view come from the points of intersection of the vertical prism with the edges of the inclined prism in the top view

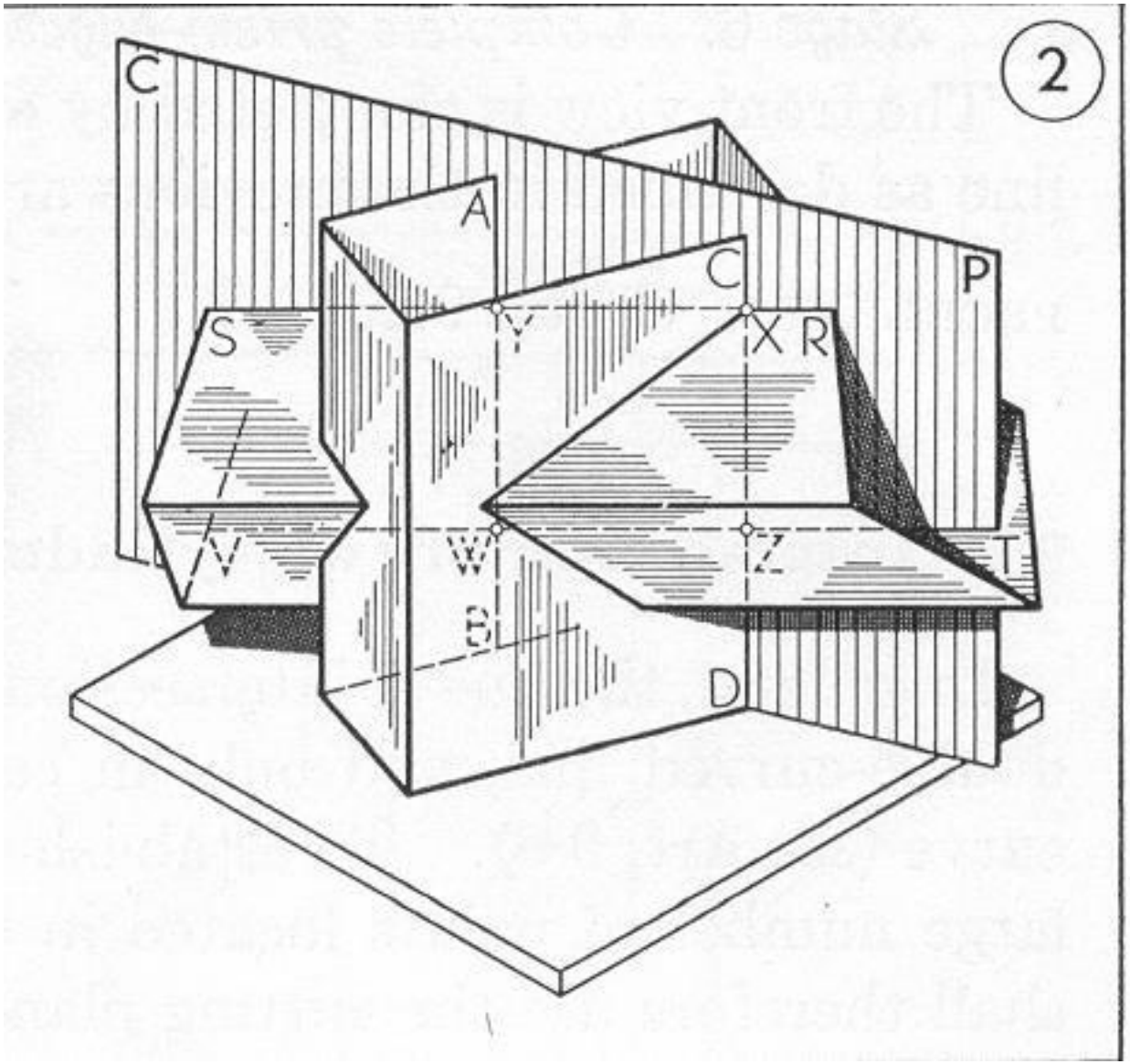
Trace the points 7, 8, 9, 10 which show the face of the inclined prism intersecting the edges of the vertical prism, back to the front view.

To be visible in the front view, a point must lie on a visible edge of one prism and on a visible face of the other;
For example pt.1 is visible and pt.4 is hidden.
1, 3, 7, 8 visible

Connecting the lines in proper sequence is the key to completion. The line should be traced around each prism in all views. like when you see in aux view there is a line from 3,4 to 9, but tin TV there is no line from 4 to 9.

So a line is drawn between 3 and 9 in front view

Intersection of two Prisms



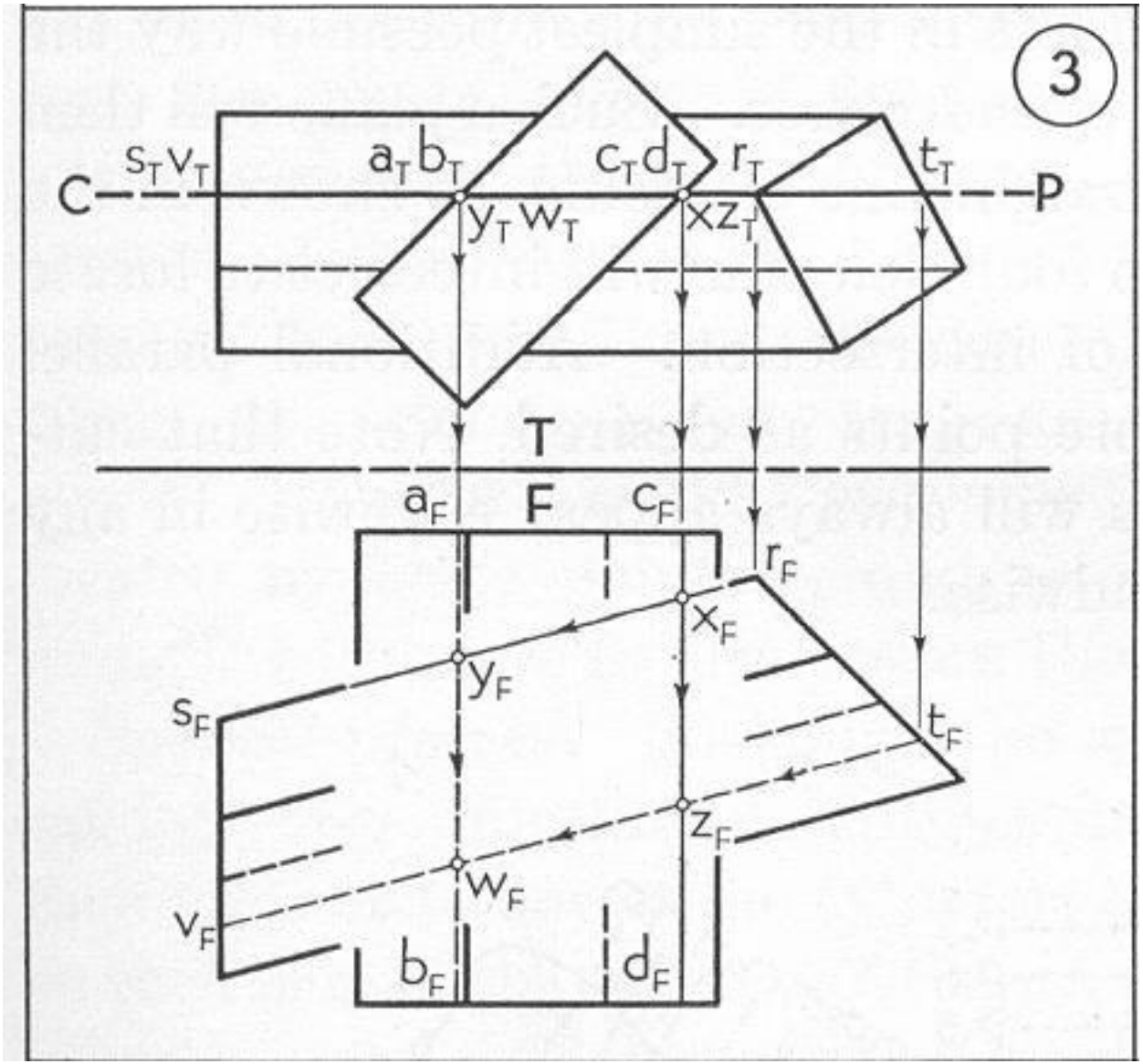
The CP is chosen across one edge RS of the prism

This plane cuts the lower surface at VT, and the other prism at AB and CD

The 4 points WZYX line in both the prisms and also on the cutting plane

These are the points of intersection required

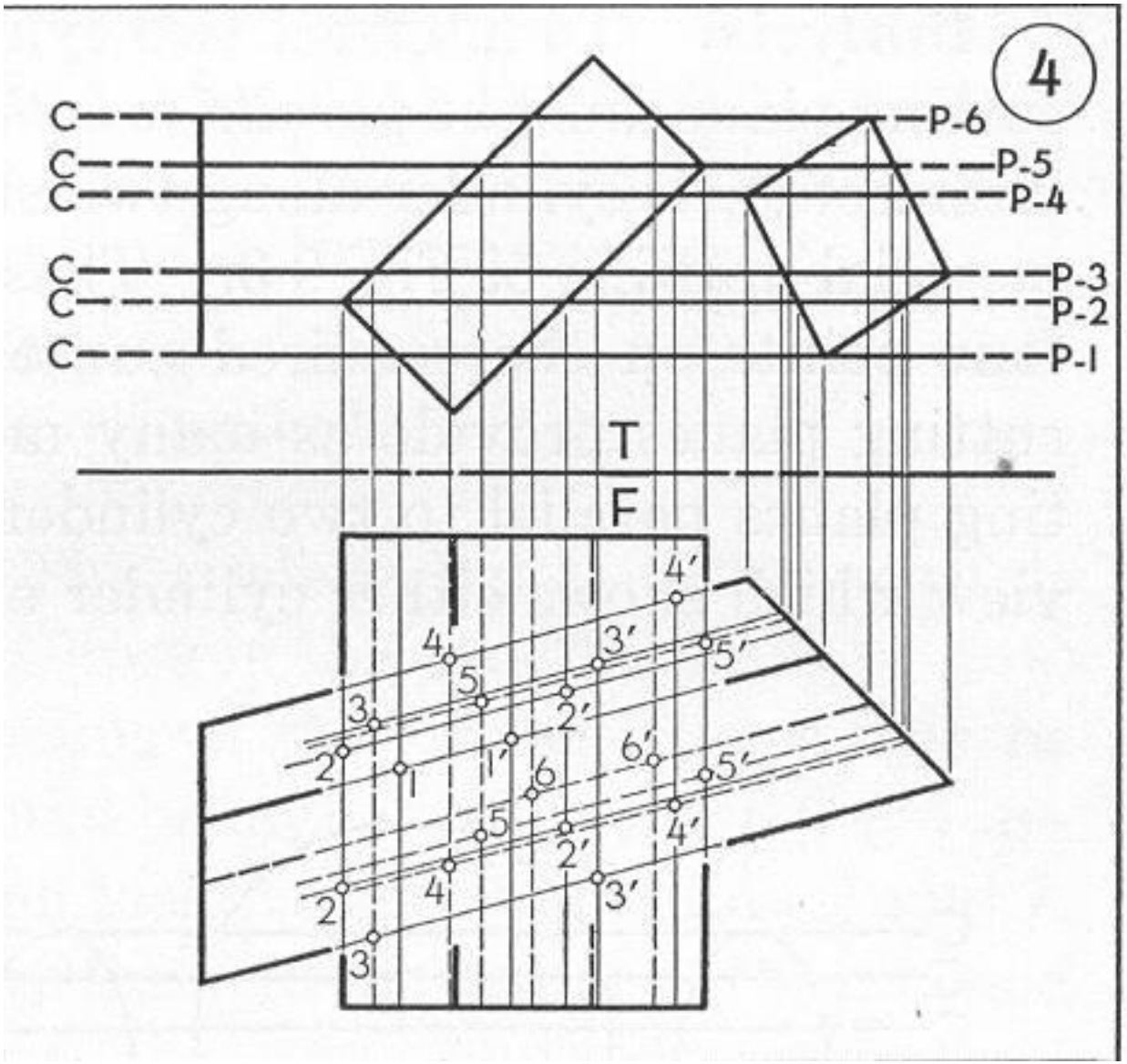
Intersection of two Prisms



The cutting plane shown in multi view projection.

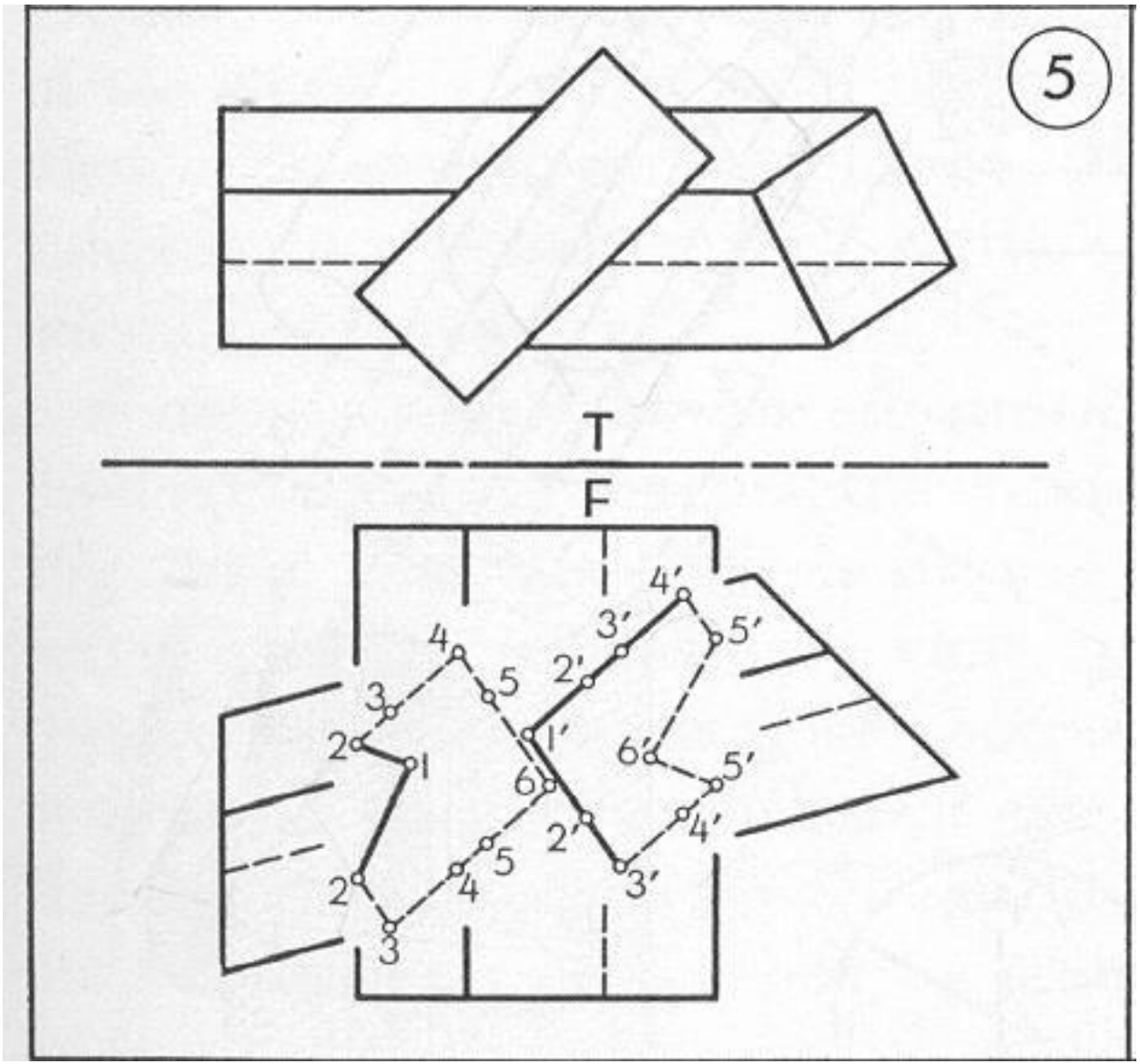
The visibility of the points are seen in the 3D

Intersection of two Prisms



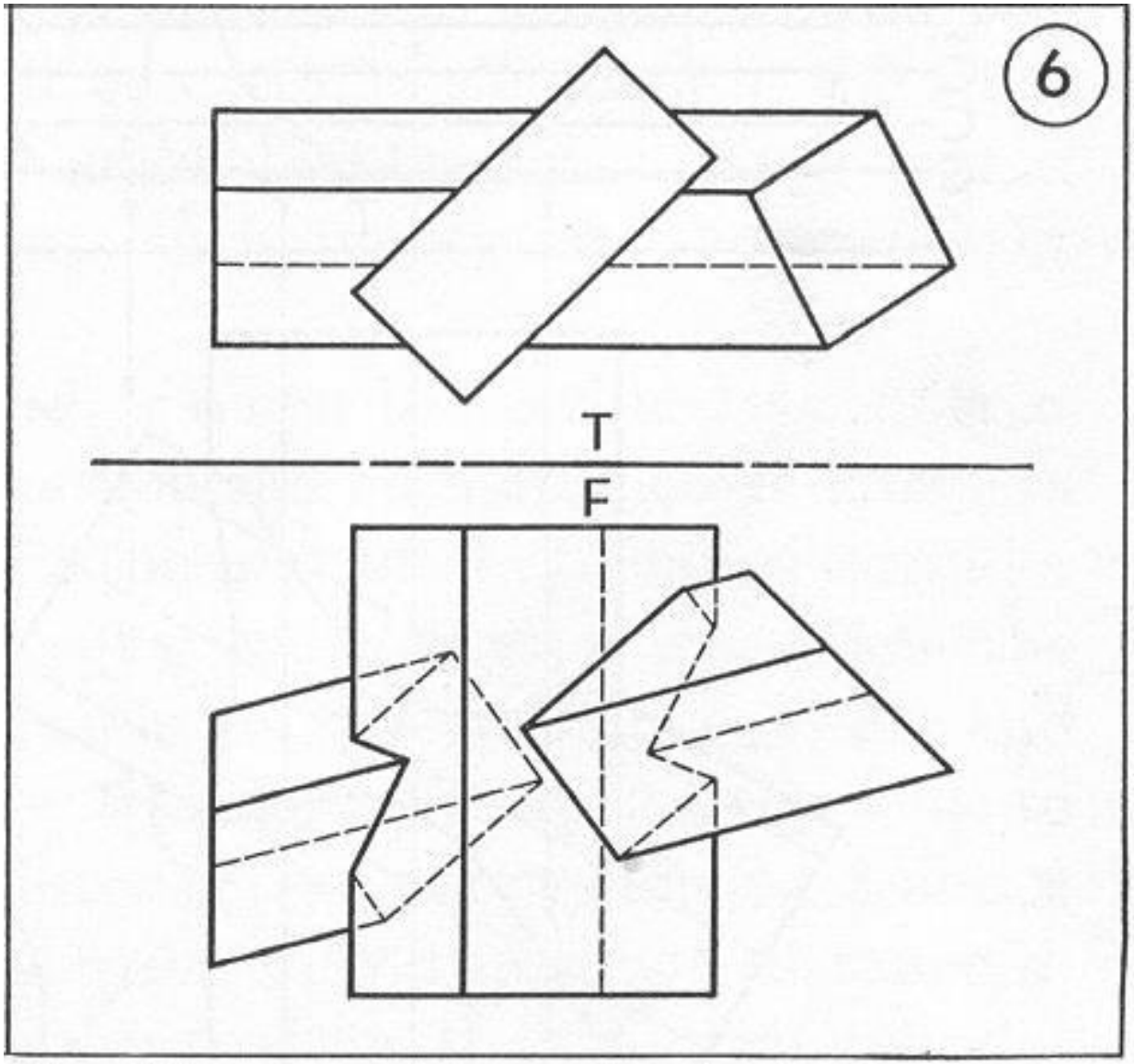
Total number of cutting planes required is 6 and locate the intersection points from the cutting planes and locate the points in the front view

Intersection of two Prisms



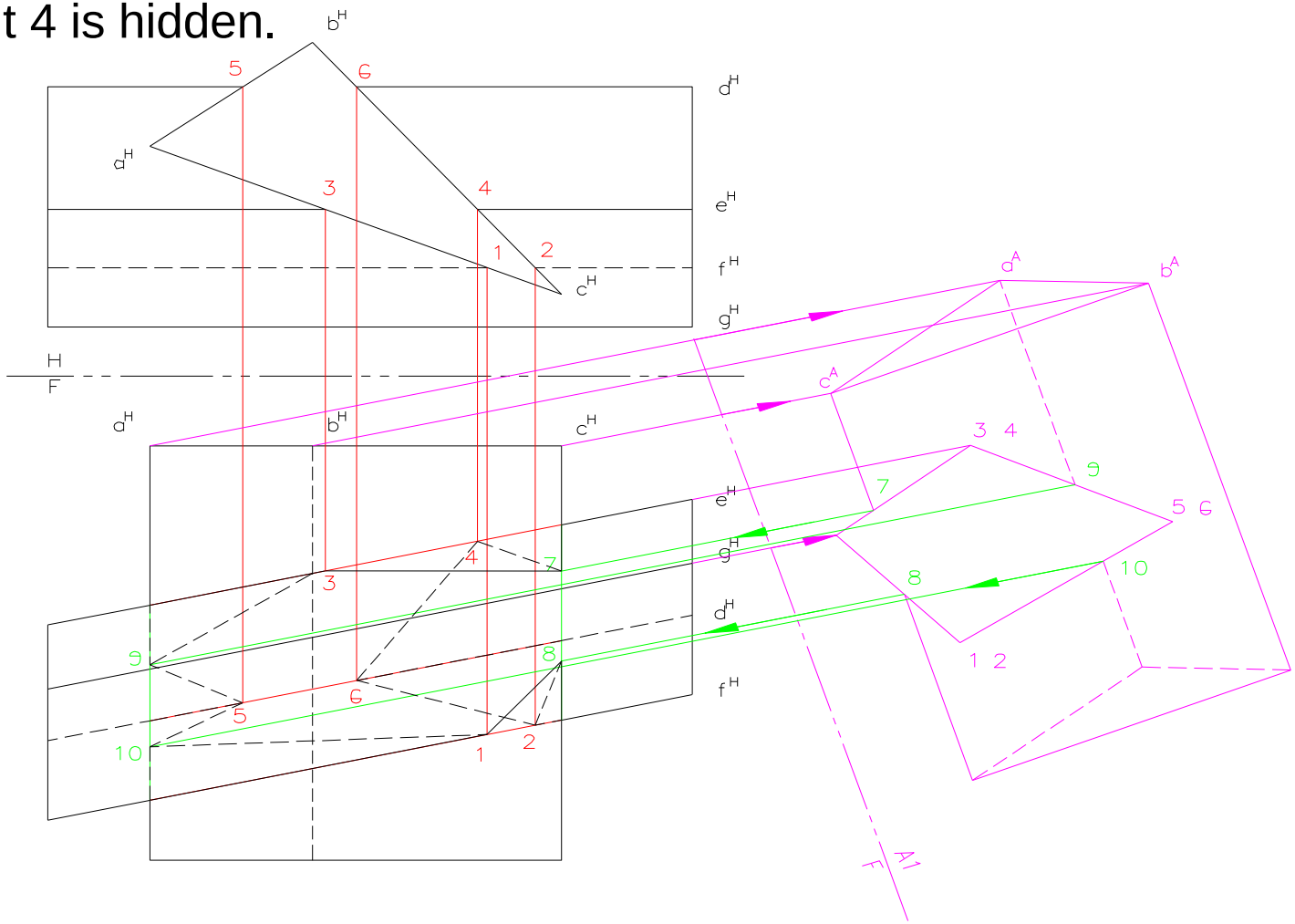
The points are connected in the front view based on the visibility and sequence

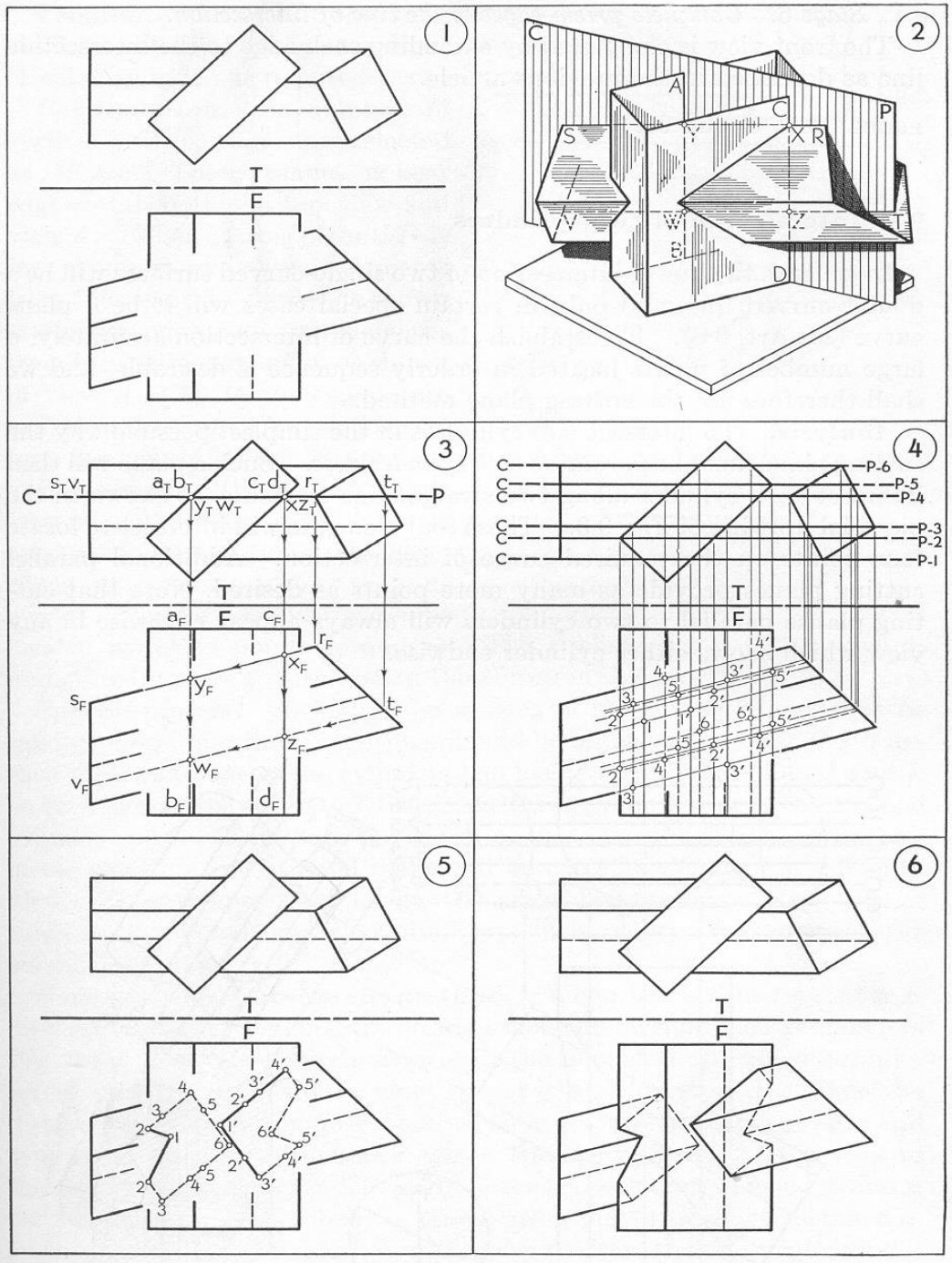
Intersection of two Prisms



Intersection of two prisms

To be visible, a point must lie on a visible edge of one prism and on a visible face of another prism. For example, point 1 is visible and point 4 is hidden.




1
T
F
2
C
A
P
S
Y
X
R
V
W
Z
T
B
D
3
C
$s_T v_T$
$a_T b_T$
$c_T d_T$
r_T
t_T
P
$y_T w_T$
$x z_T$
T
a_F
F
c_F
r_F
x_F
y_F
s_F
t_F
z_F
w_F
v_F
b_F
d_F
4
C
P-6
P-5
P-4
P-3
P-2
P-1
T
F
5
T
F
6
T
F