

Some key Geometric Principles



1. A line projects as a true length when a view perpendicular to the line is taken
- A line parallel to the VP will appear as a true length in elevation
- A line parallel to the HP will appear as a true length in plan
2. Parallel lines appear parallel in every view
3. If a line is parallel to any line on a plane, it is parallel to the plane
4. A line projects as a point when we look along its true length
5. A plane projects as an edge when any line on the plane projects as a point
6. The true shape of a plane is seen on a projection plane which is parallel to the plane
7. Two planes intersect in a line
8. The dihedral angle between two planes is seen in a view showing the planes as edges
9. The true angle between a line and a plane is seen in a view showing the line as a true length and the plane as an edge
10. All horizontal sections of an upright or inverted right cone are circles
11. A sphere appears as a circle in every view
12. A sphere and cone in contact will have a common tangent plane
13. When two spheres touch one another:
 - the point of contact lies on the line joining the two centres
 - the distance between their centres is equal to the sum of the radii
 - the point of contact can be located in any view, by dividing the line in the ratio of the radii
14. The vertical trace of a plane is the line in which the plane meets the V.P.
15. The horizontal trace of a plane is the line in which the plane meets the H.P.



A line projects as a true length when a view is taken looking perpendicular to the line

Parallel lines appear parallel in every orthographic view

If a line is parallel to any line on a plane, it is parallel to the plane

A line projects as a point when we look along its true length

A plane projects as an edge when any line on the plane projects as a point

The true shape of a plane is seen on a projection plane which is parallel to the plane

Two planes intersect in a line

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The true angle between a line and a plane is seen in a view showing the line as a true length and the plane as an edge

All horizontal sections of an upright or inverted right cone are circles

A sphere appears as a circle in every view

A sphere and cone in contact will have a common tangent plane

When two spheres touch one another

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The vertical trace of a plane is the line in which the plane meets the V.P.

The horizontal trace of a plane is the line in which the plane meets the H.P.