

Some Key Geometric Principles

1. A line projects as a true length when a view is taken looking perpendicular to the line
 - 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 orthographic 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.