Intersecting Lines and Planes

Lines

Parallel

Compare direction vectors, if they are multiples of each other they are parallel.

Coincident

If the lines a parallel and they share points they are coincident. (They are the same line)

Skew

2 lines that are not intersecting and also are not parallel.
Distance between two skew lines:
$\vec{v}_1$ and $\vec{v}_2$ are the direction vectors and P and S are points on the lines L_1 and L_2 respectively.

$$\text{Length} = \vec{PS} \cdot \frac{\vec{v}_1 \times \vec{v}_2}{\|\vec{v}_1 \times \vec{v}_2\|}$$

Intersecting

Equate the 2 lines, if you get a solution you have intersecting lines.

Planes

Parallel

Two planes are parallel if their normal vectors are parallel.

Intersecting

If two planes are not parallel, they will intersect in a line.

Direction Vector of Intersection Line

The direction vector for the line of intersection is found by the cross product of the normal vectors from the two planes.