Intersection of Line and Plane

There are three possible situations:

Ⓐ line intersects plane   Ⓑ line is parallel to plane   Ⓒ line lies in plane
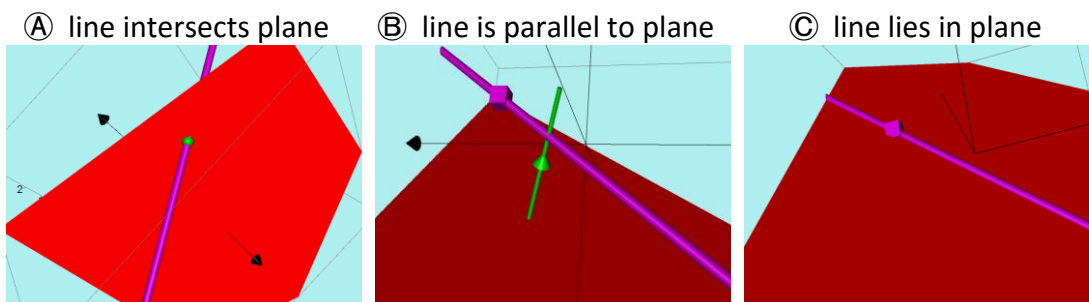
The method for finding the **intersection** of a line and plane is as follows

1. Write the equation of the line in parametric form
2. Substitute these values for x, y and z into the Cartesian equation of the plane
3. Solve for the parameter (e.g. λ)
4. Find the point of intersection by substituting this value in to the parametric equation of a line

Ⓐ If the line intersects the plane => you can find a value for λ

Ⓑ If the line is parallel to the plane => you get an equation that is **never** true for λ

Ⓒ If the line lies in the plane => you get an equation that is **always** true for λ

Also, for Ⓑ and Ⓒ, the line is **perpendicular** to the normal to the plane.

Reflecting a Point in a Plane
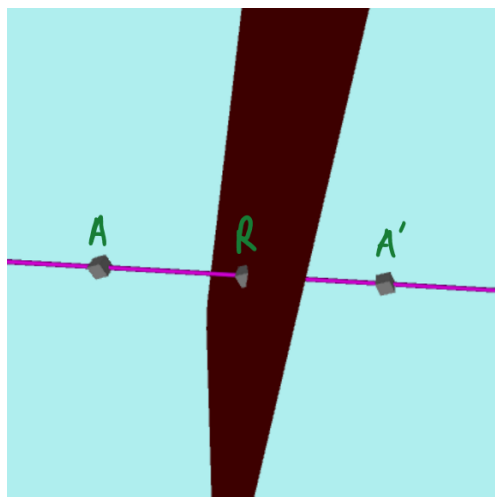
We can find the coordinates of the reflection of a point in a plane:

- Find the equation of a line that goes through the point that is **perpendicular** to the plane.
- Find the intersection of the line with the plane.
- Use symmetry to work out the coordinates of the reflected point.

INTHINKING