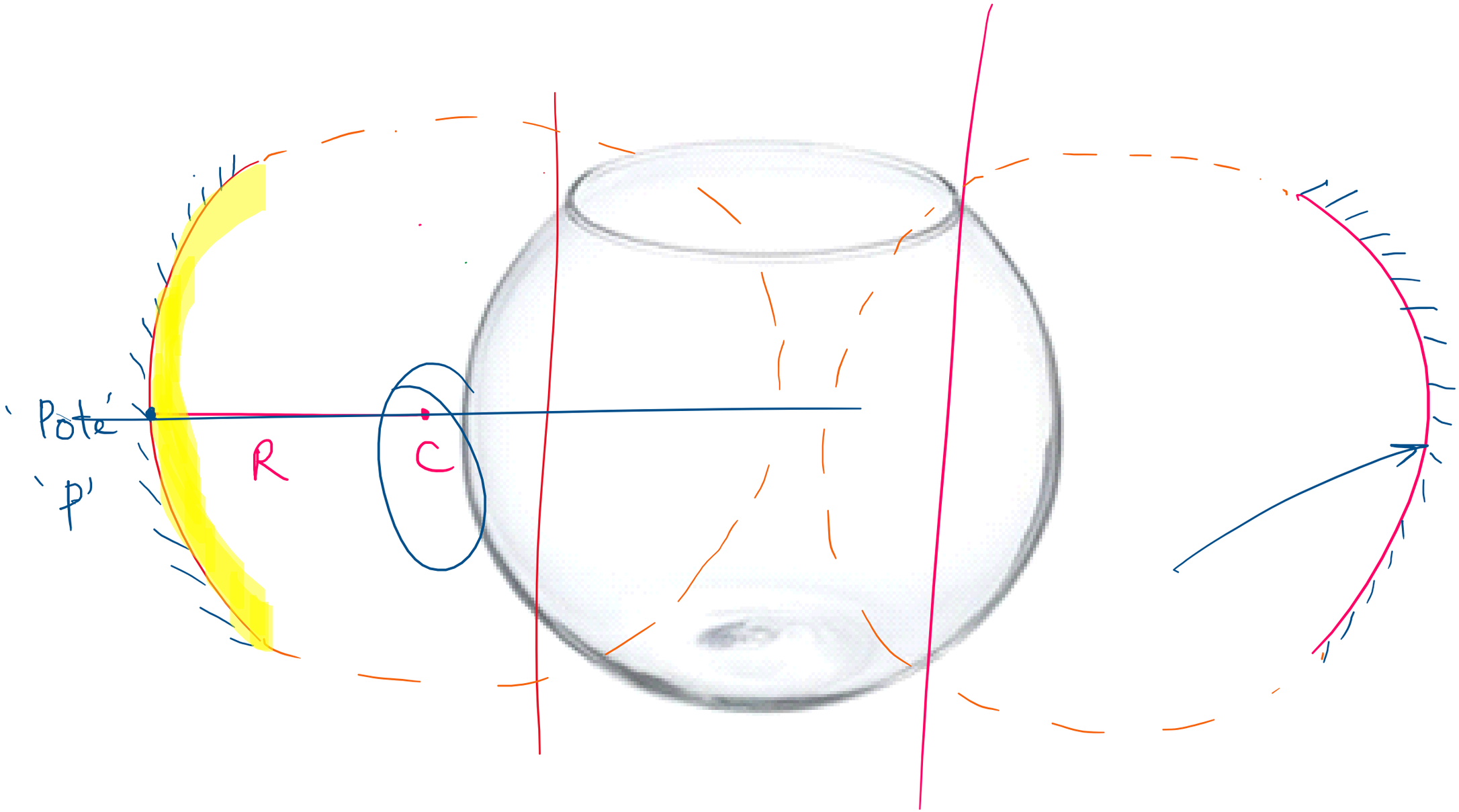
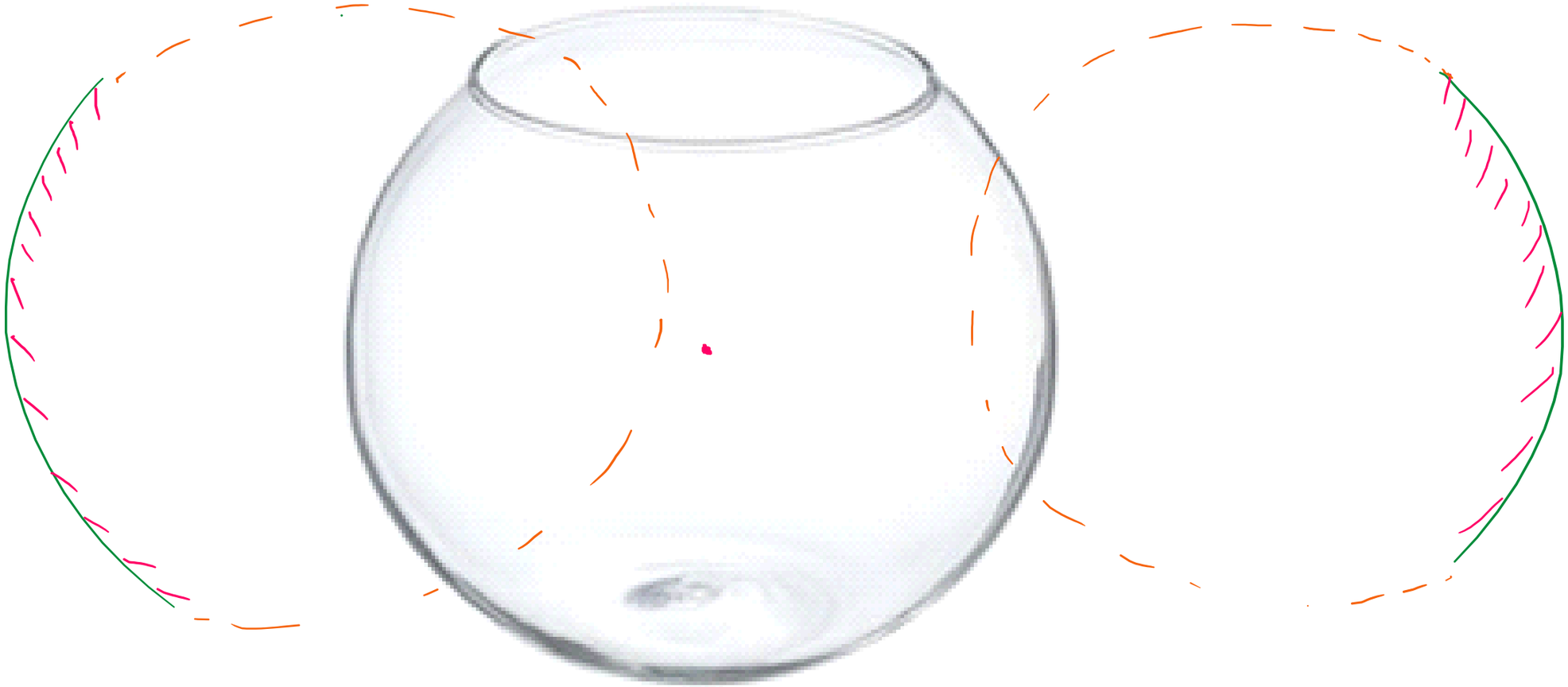
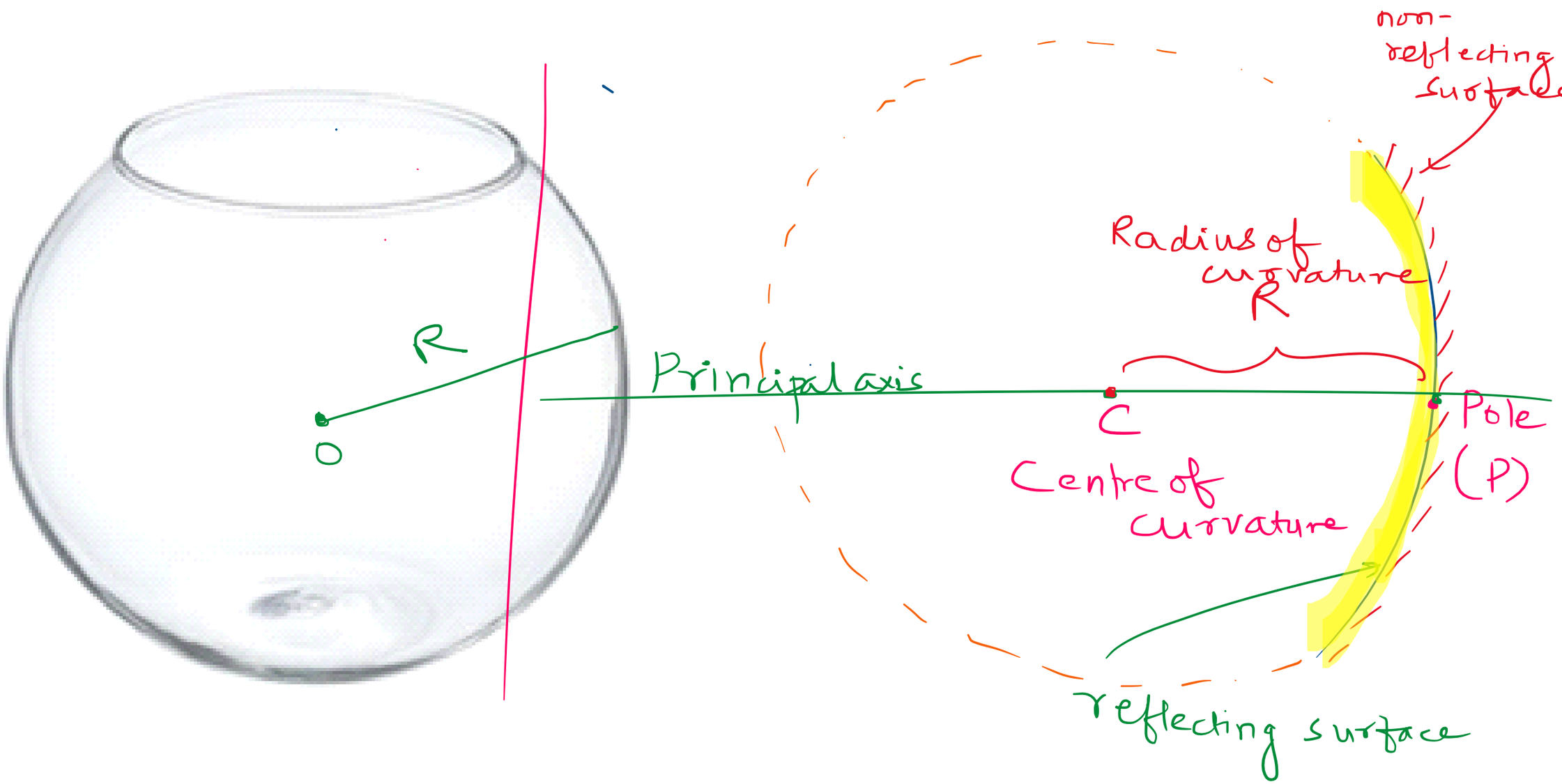
10th CBSE Science

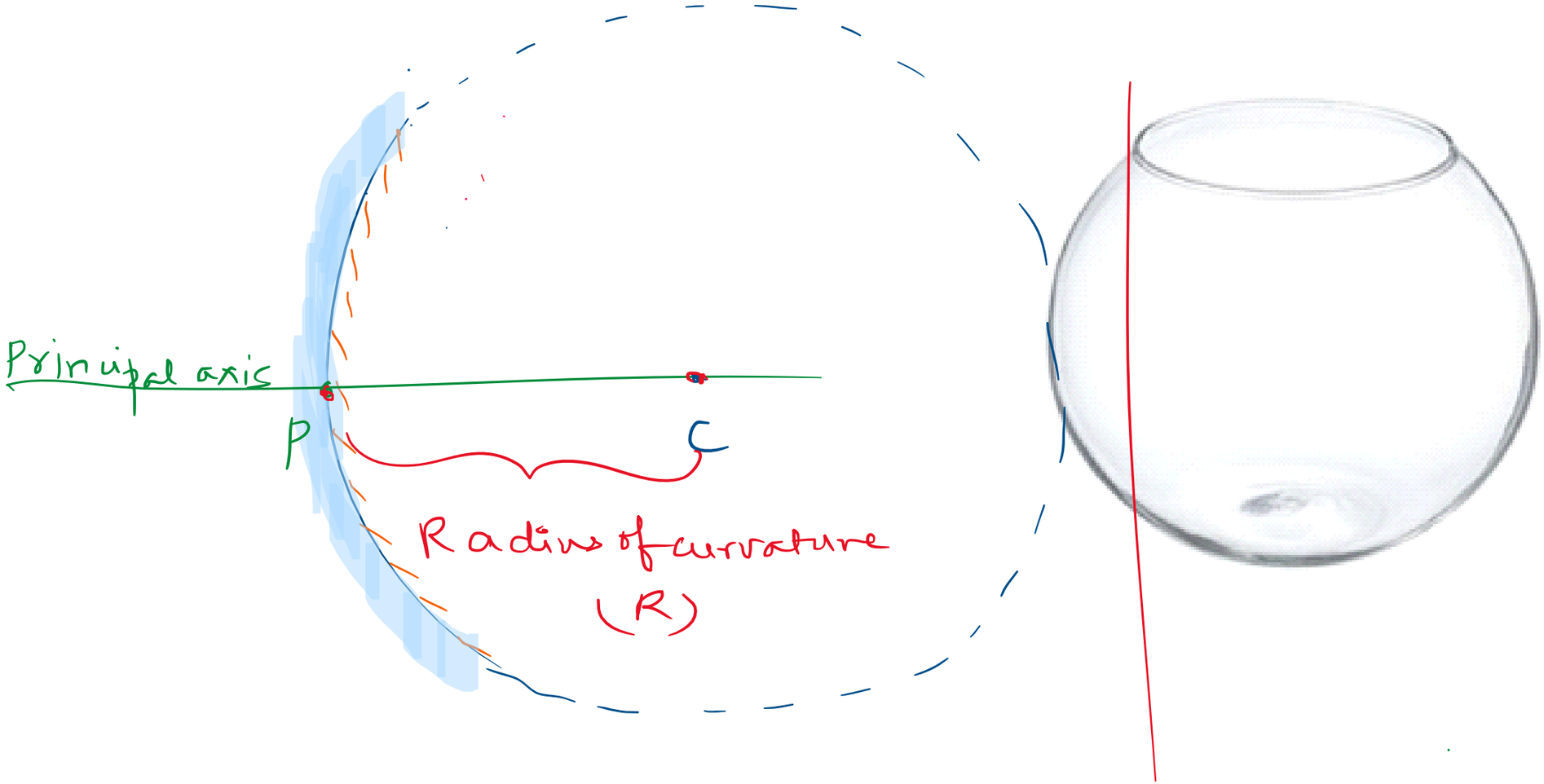
09. Light – Reflection and Refraction

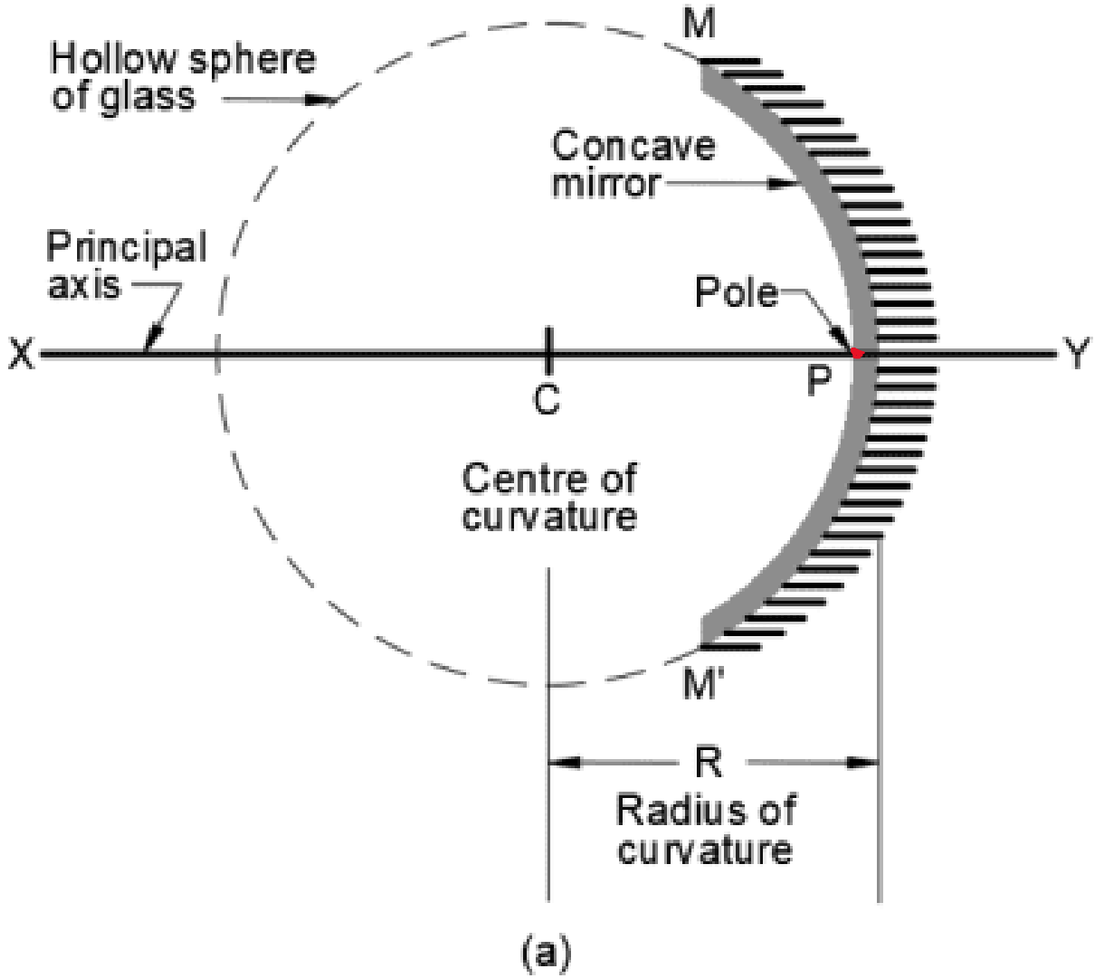
Lecture 2


Pole
p'
R
C

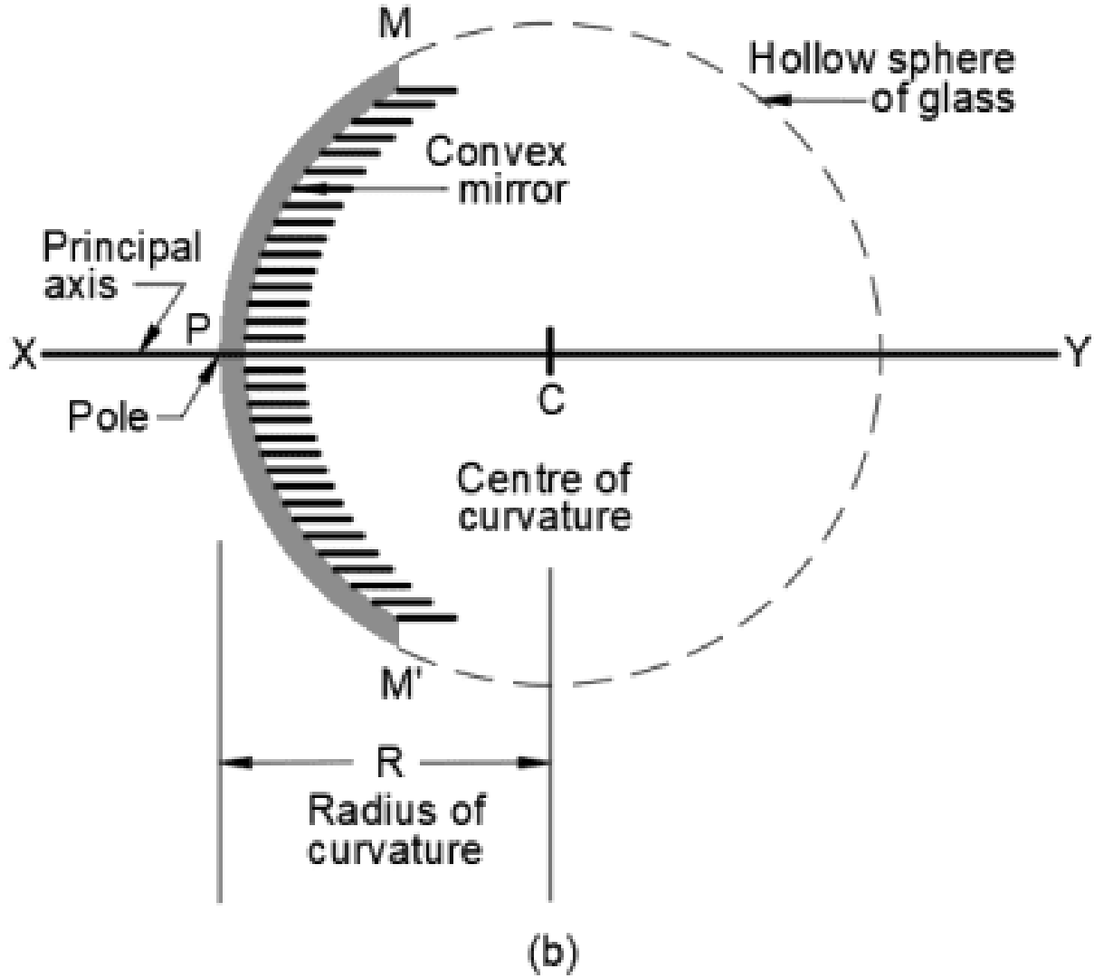



non-
reflecting
surface
Radius of
curvature
R
R
O
Principal axis
C
Centre of
curvature
Pole
(P)
reflecting surface


Principal axis
P
C
Radius of curvature
(R)

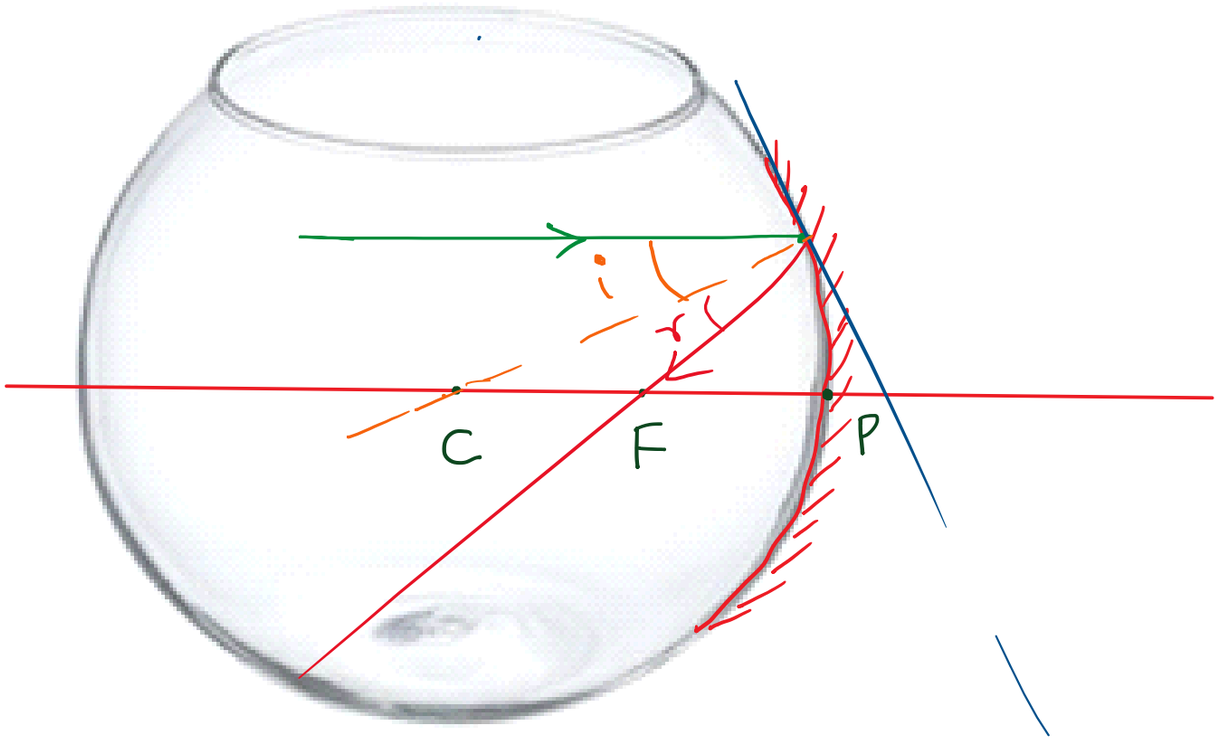

M
Hollow sphere
of glass
Concave
mirror
Principal
axis
Pole
X
Y
C
P
Centre of
curvature
M'
R
Radius of
curvature

(a)

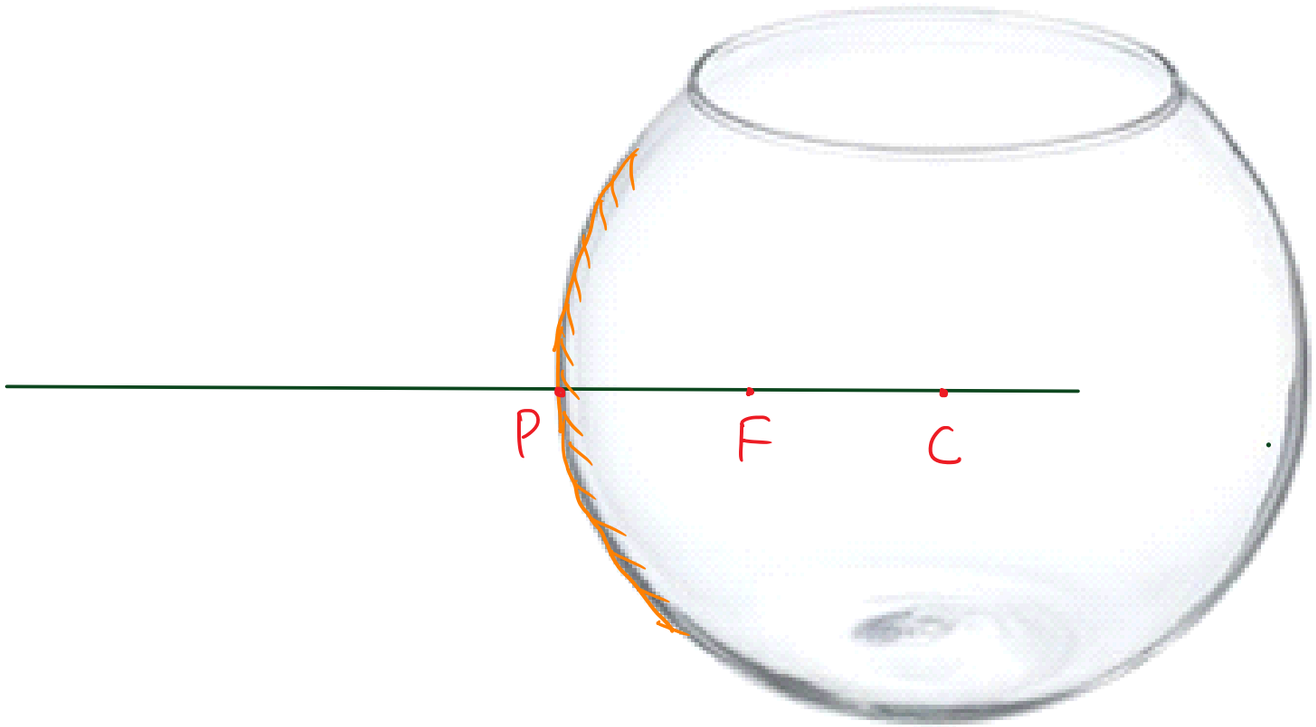

M
Hollow sphere
of glass
Convex
mirror
Principal
axis
P
X
Y
Pole
C
Centre of
curvature
M'
R
Radius of
curvature

(b)

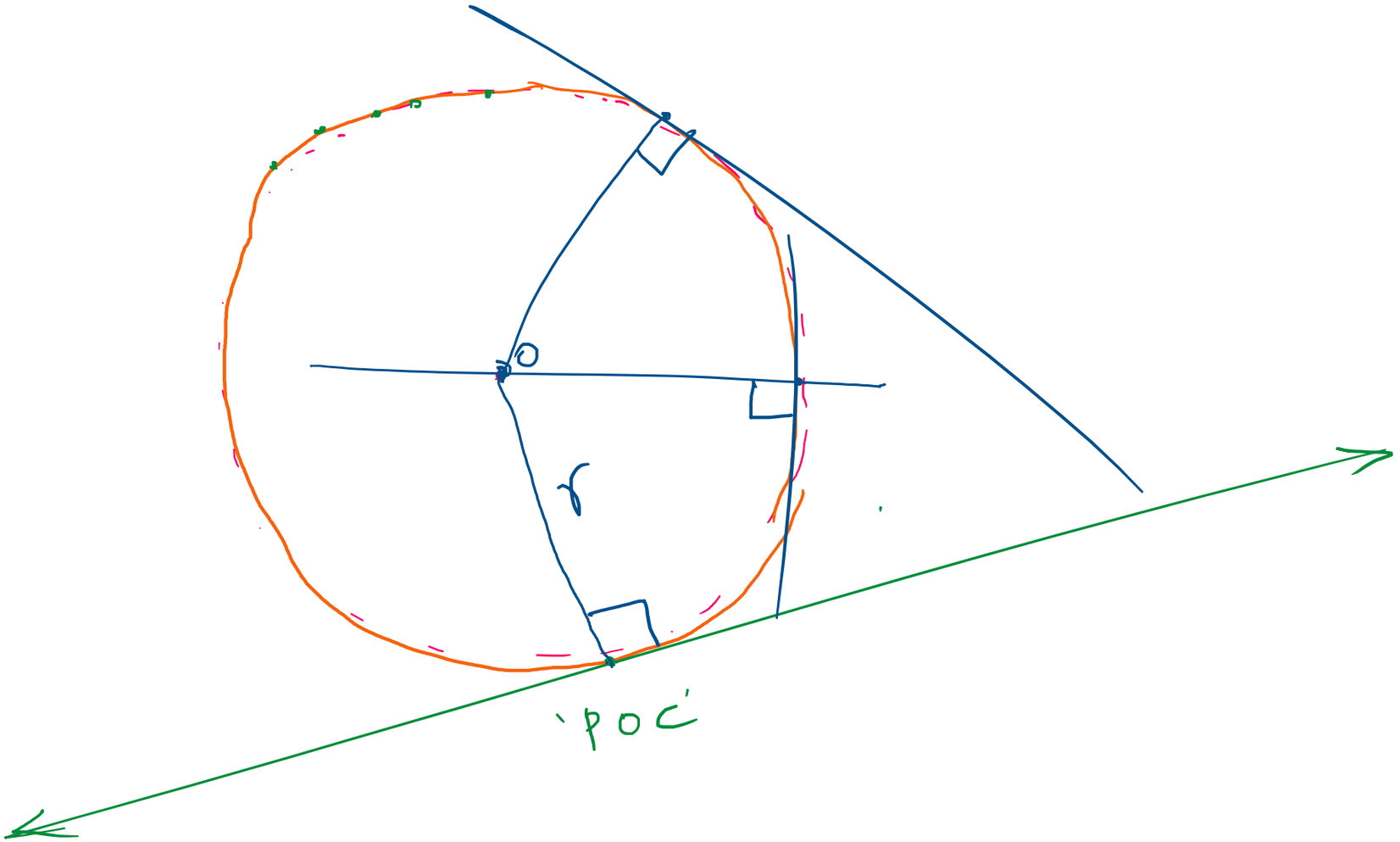
A spherical mirror is that mirror whose reflecting surface is the part of a hollow sphere of glass.

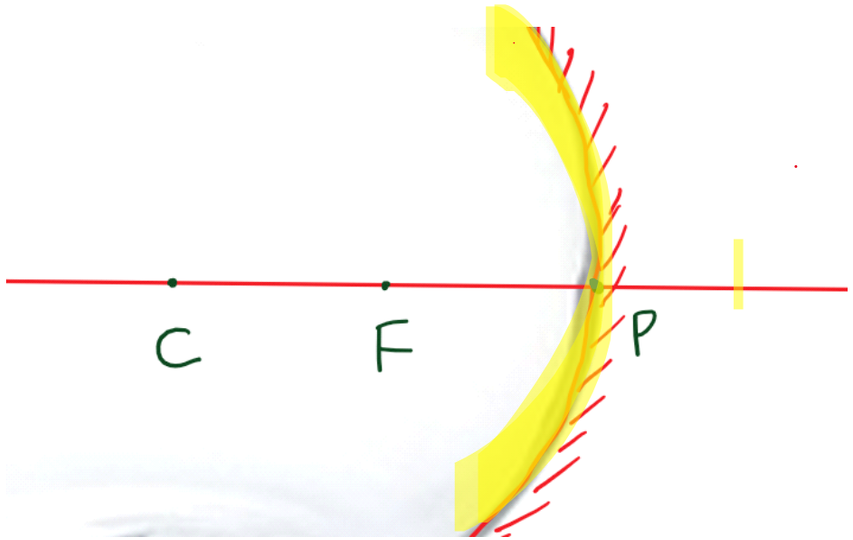


A spherical mirror, whose reflecting surface is curved inwards, that is, faces towards the centre of the sphere, is called a concave mirror.



A spherical mirror whose reflecting surface is curved outwards, is called a convex mirror.

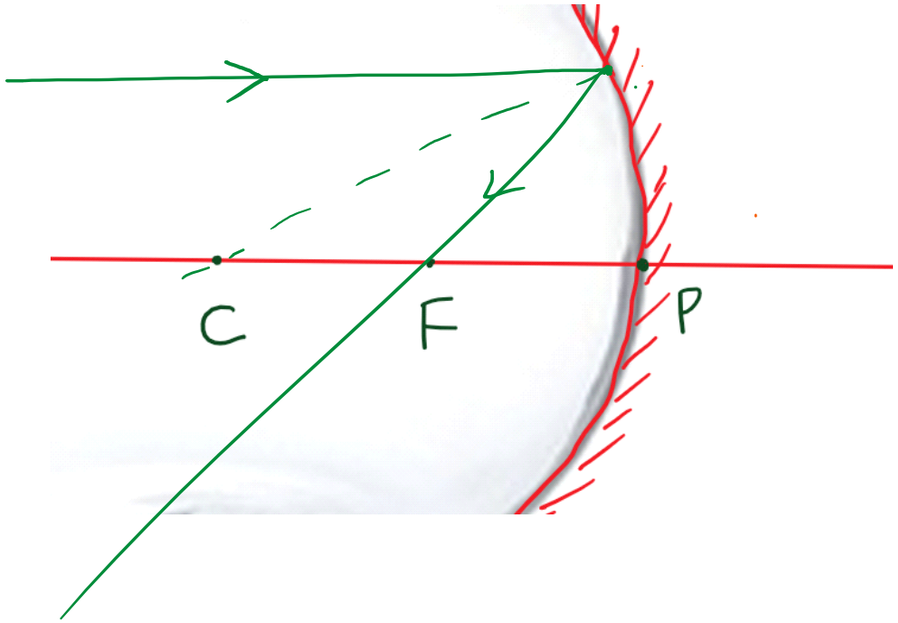

O
r
poc

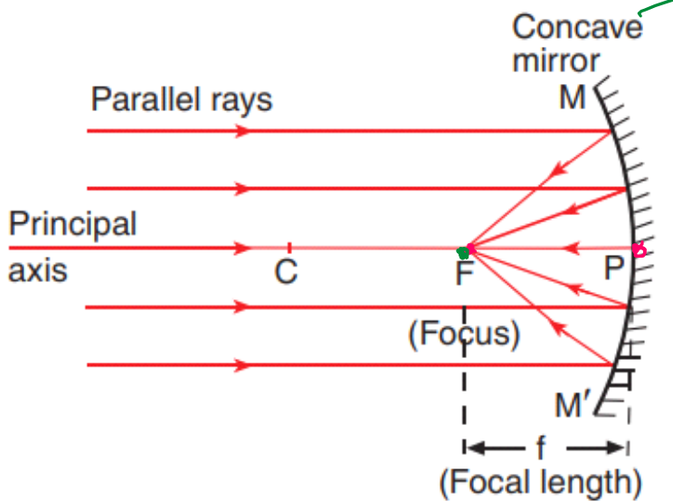


- The centre of the reflecting surface of a spherical mirror is a point called the pole. It lies on the surface of the mirror. The pole is usually represented by the letter P.
- The centre of the sphere of which the reflecting surface of a spherical mirror forms a part, is called the centre of curvature of the mirror. It is represented by the letter C

- The radius of the sphere of which the reflecting surface of a spherical mirror forms a part, is called the radius of curvature of the mirror. It is represented by the letter R
- An imaginary straight line passing through the pole and the centre of curvature of a spherical mirror is called the principal axis.

converging mirror

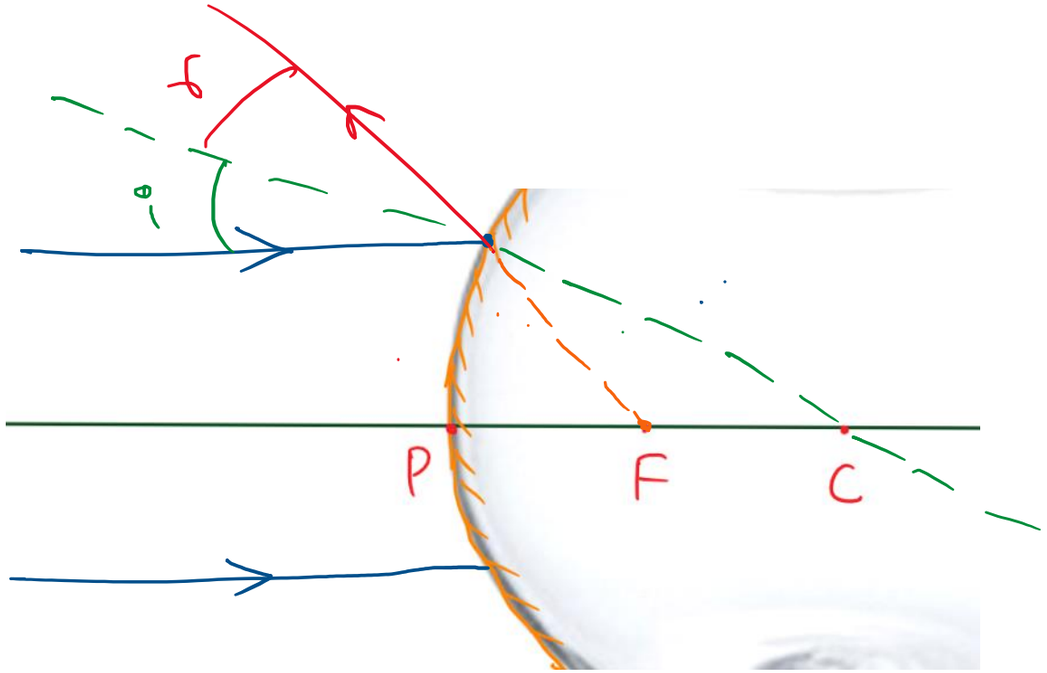


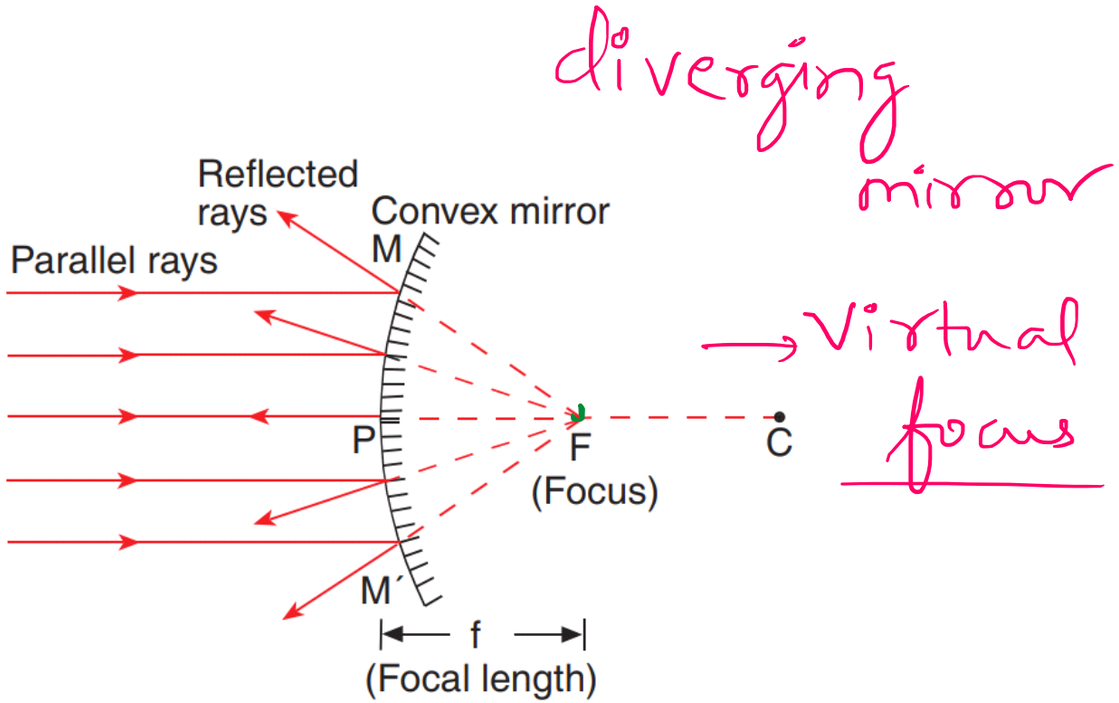


Real focus

The principal focus of a concave mirror is a point on its principal axis to which all the light rays which are parallel and close to the axis, converge after reflection from the concave mirror.

The focal length of a concave mirror is the distance between its pole and principal focus.

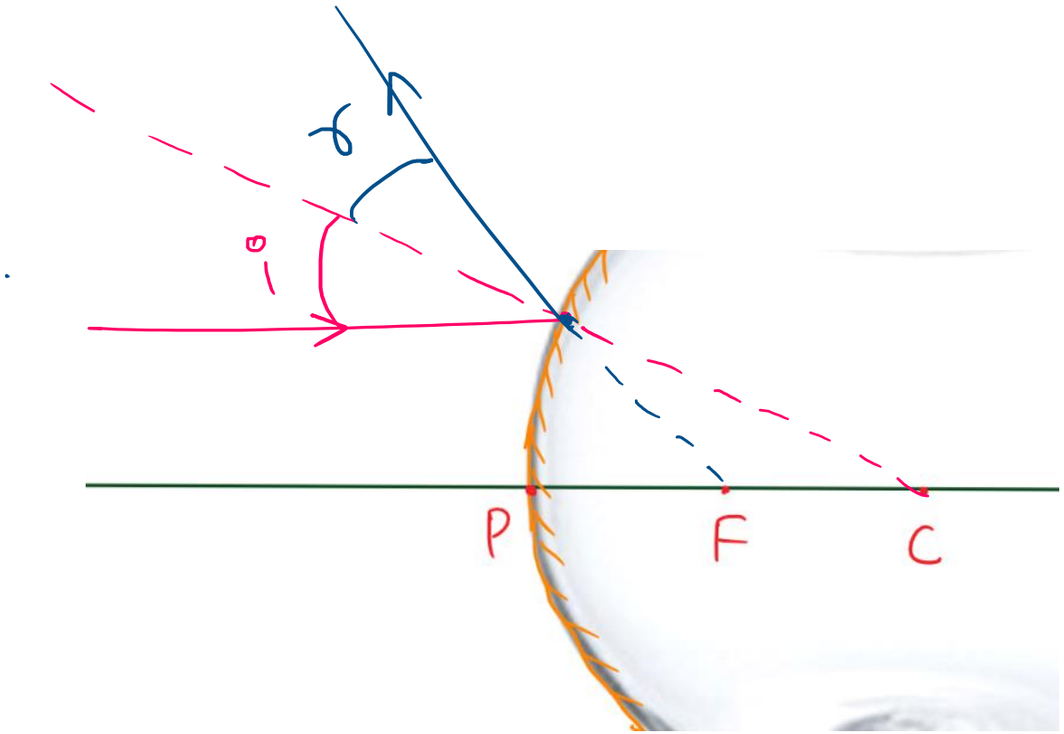




diverging mirror

→ Virtual focus

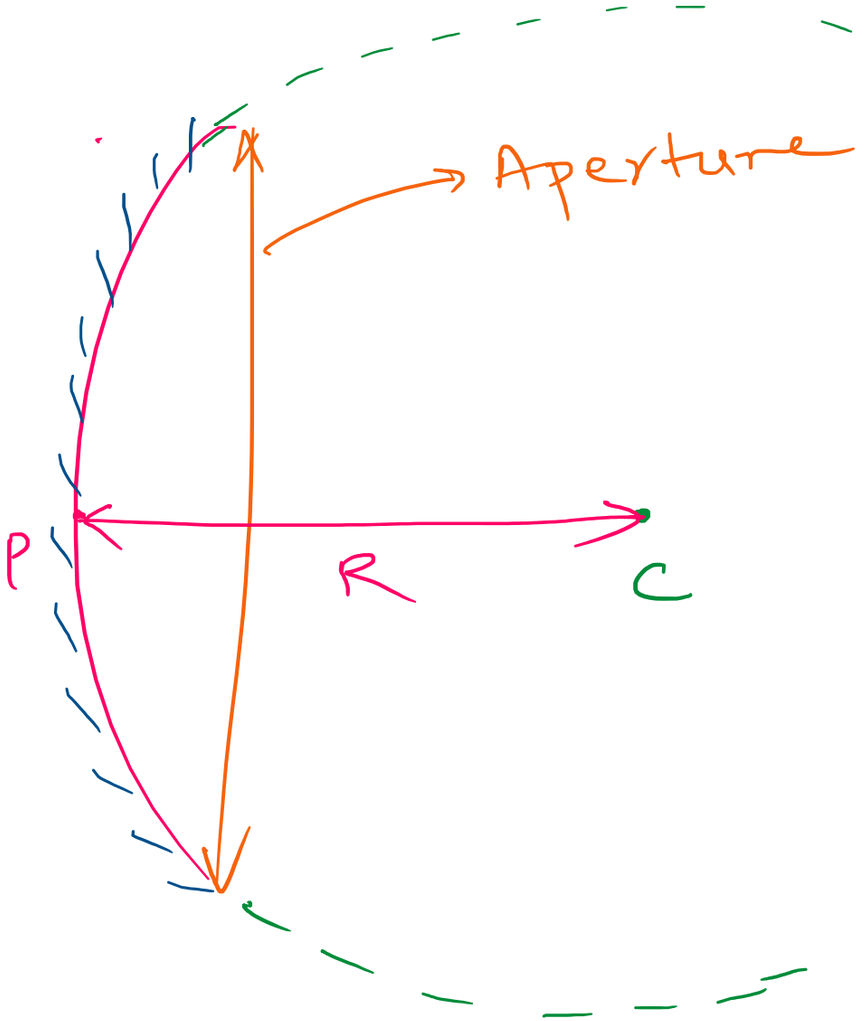
The principal focus of a convex mirror is a point on its principal axis from which a beam of light rays, initially parallel to the axis, appears to diverge after being reflected from the convex mirror.

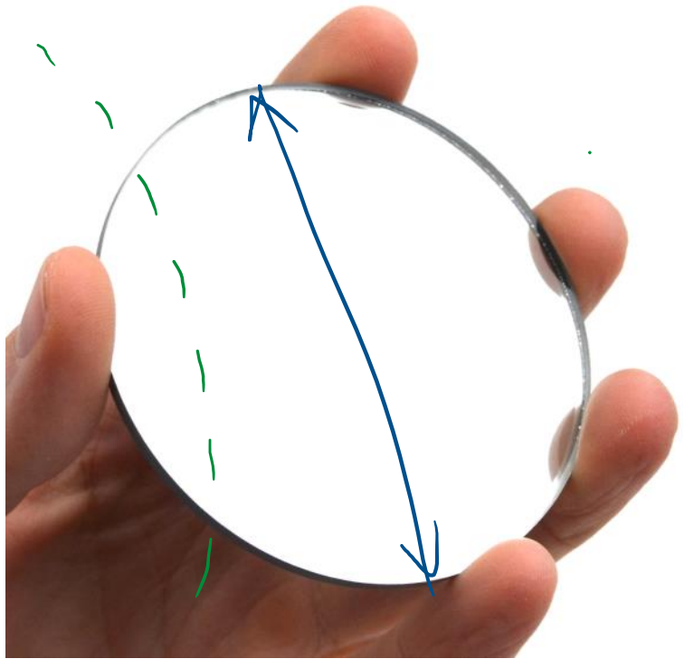

γ
α
P
F
C

Relation between Radius of Curvature and Focal Length of a Spherical Mirror

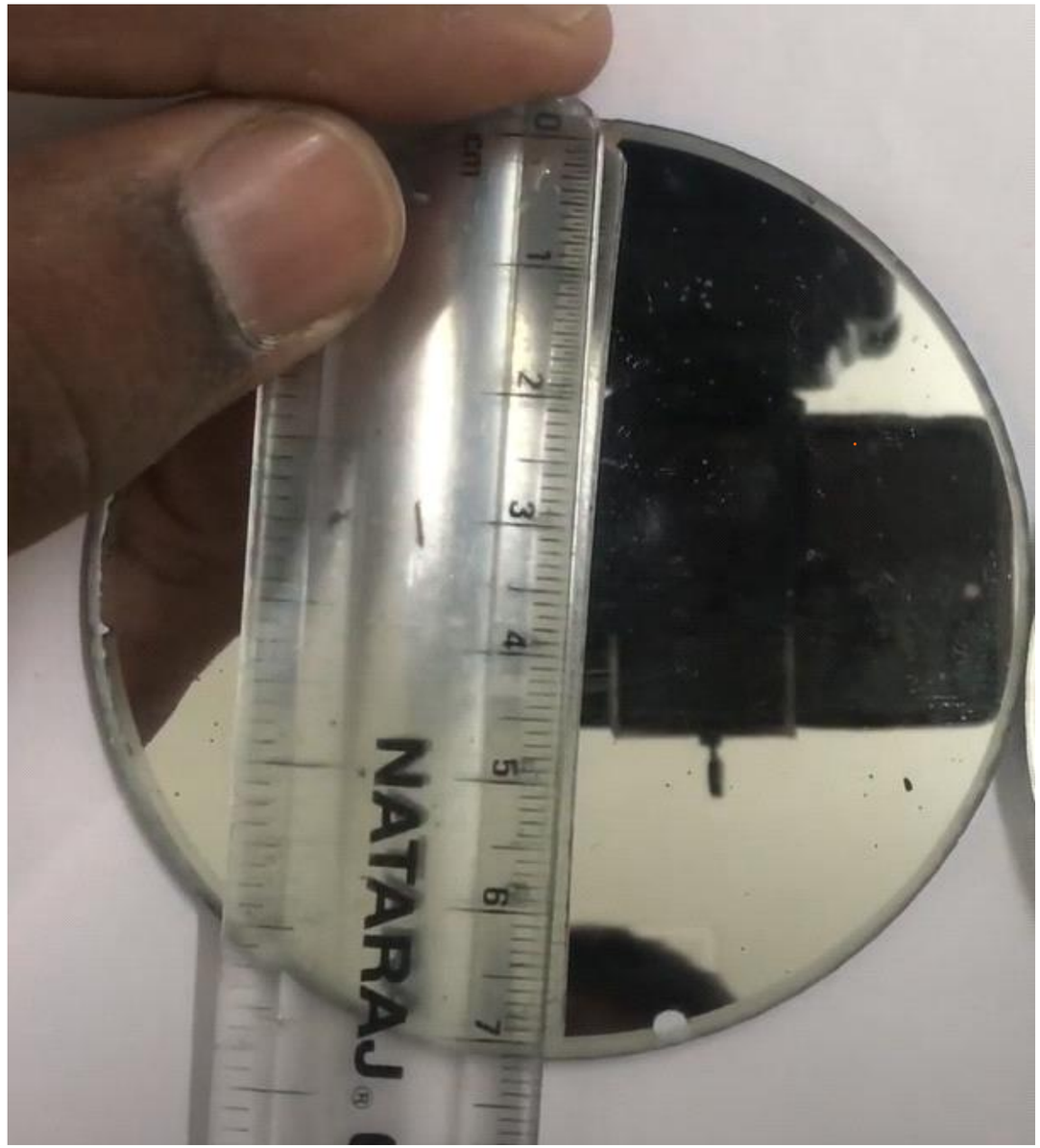
$(R = 2f)$

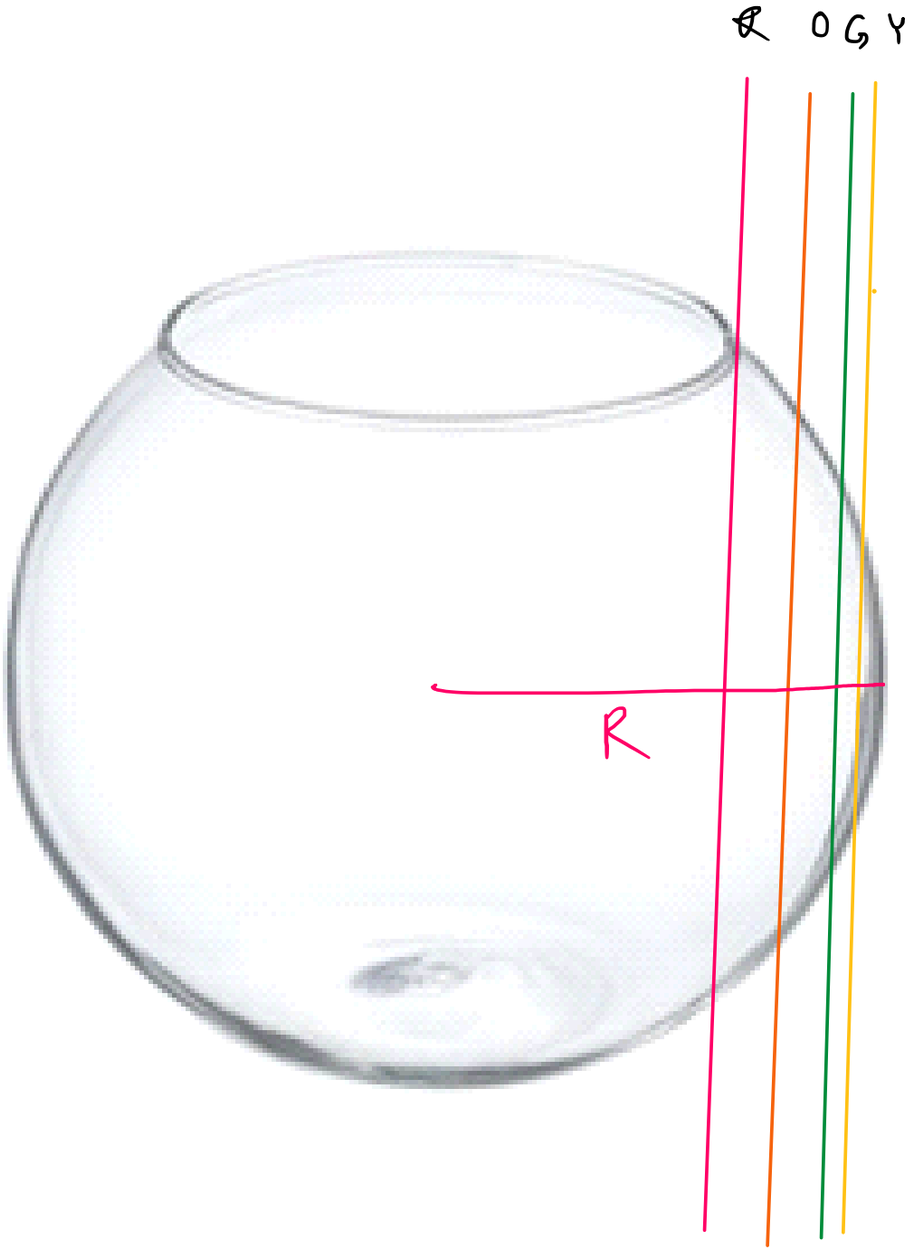
The diameter of the reflecting surface of spherical mirror is called its aperture.



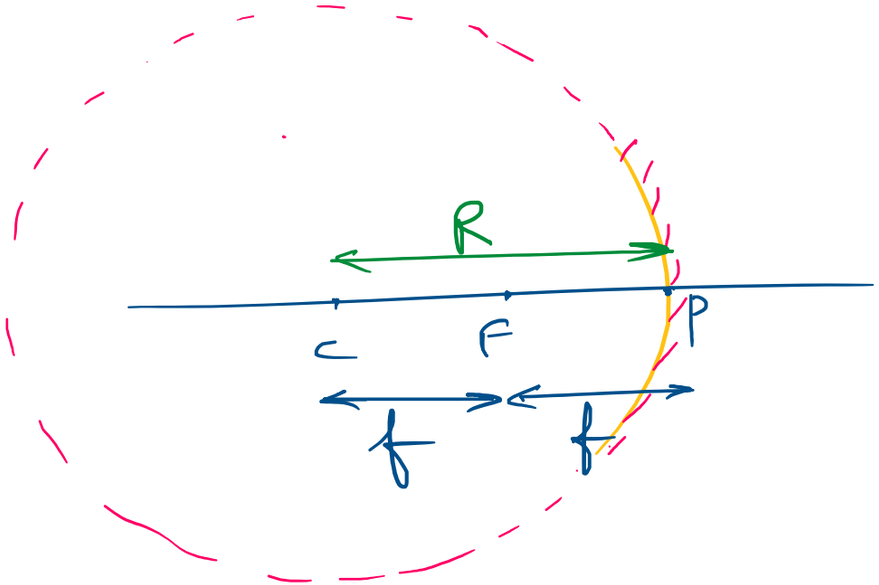


cm
NATARAJ

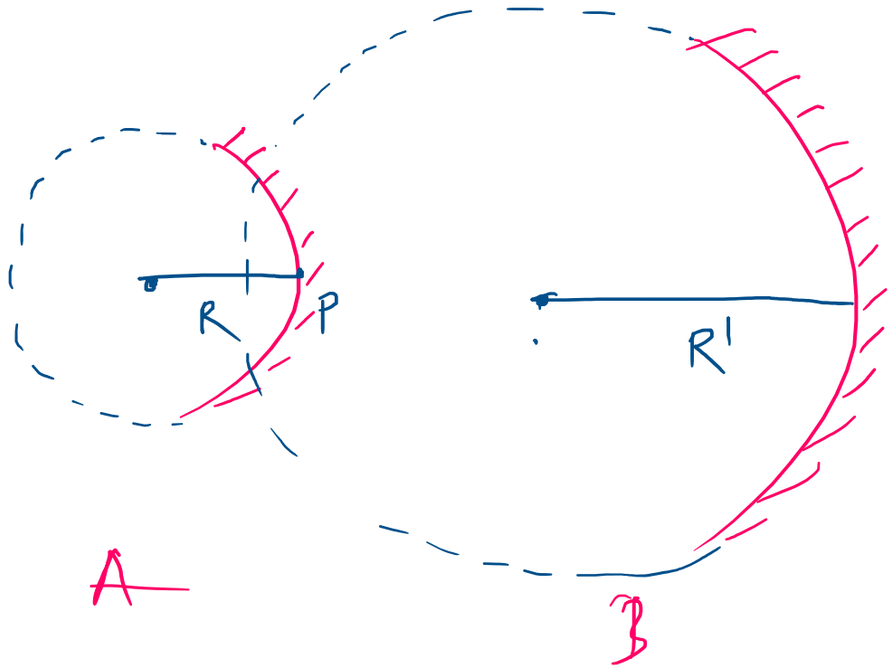
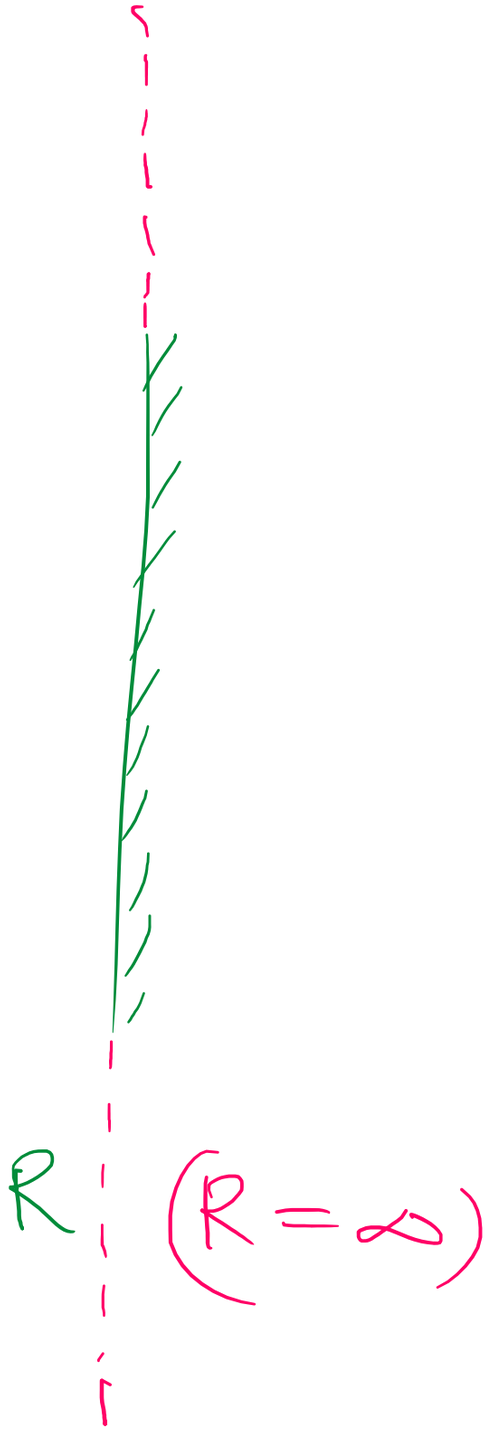
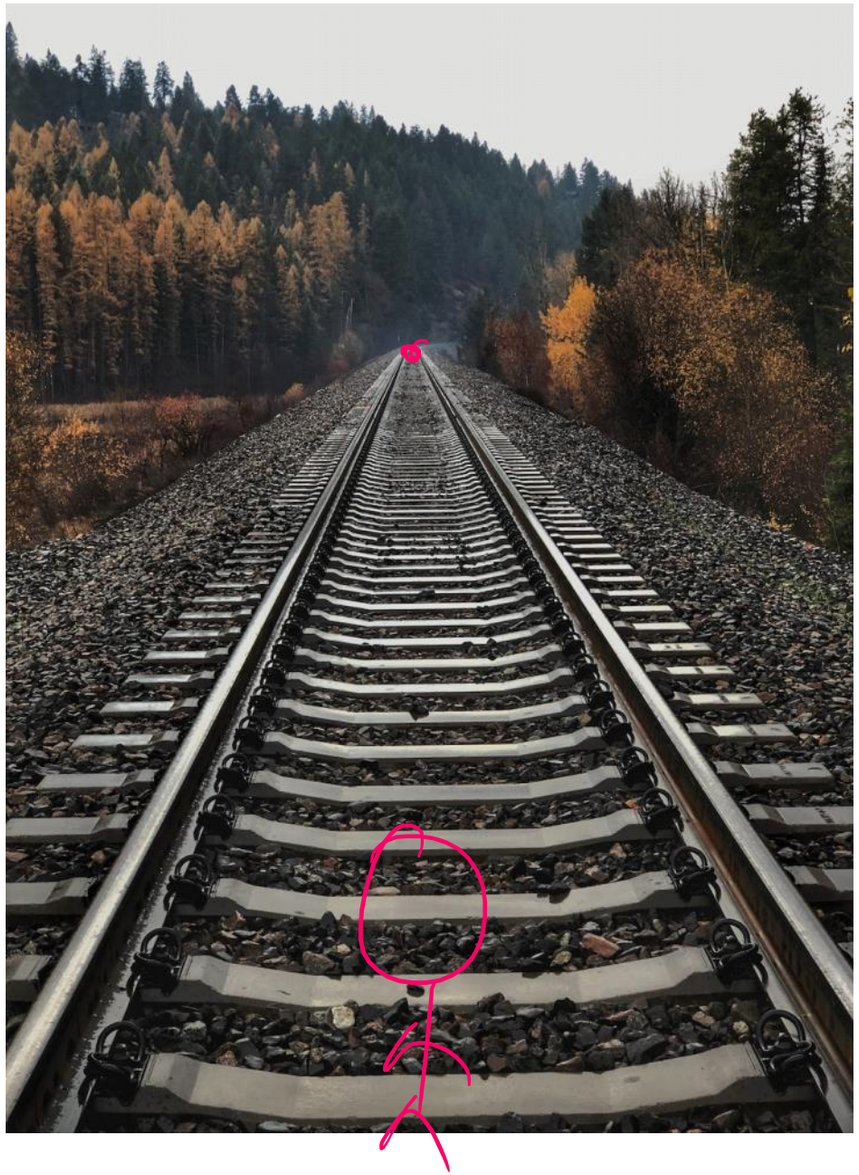

cm
NATARAJ



When aperture is smaller than the radius of curvature; then 'F' is the midpoint of P & C



$R = f + f$

$\boxed{R = 2f}$

largest R ⟶ C