

# UPDAAN



## 2025

# LIGHT

- Reflection & Refraction

**PHYSICS**

**Lecture - 02**

**By - ER. RAKSHAK SIR**



# Topics to be covered



1

Reflection - Laws

2

Reflection plane Mirror

3

Spherical Mirrors - Concave and Convex

4

Ray Diagrams

5





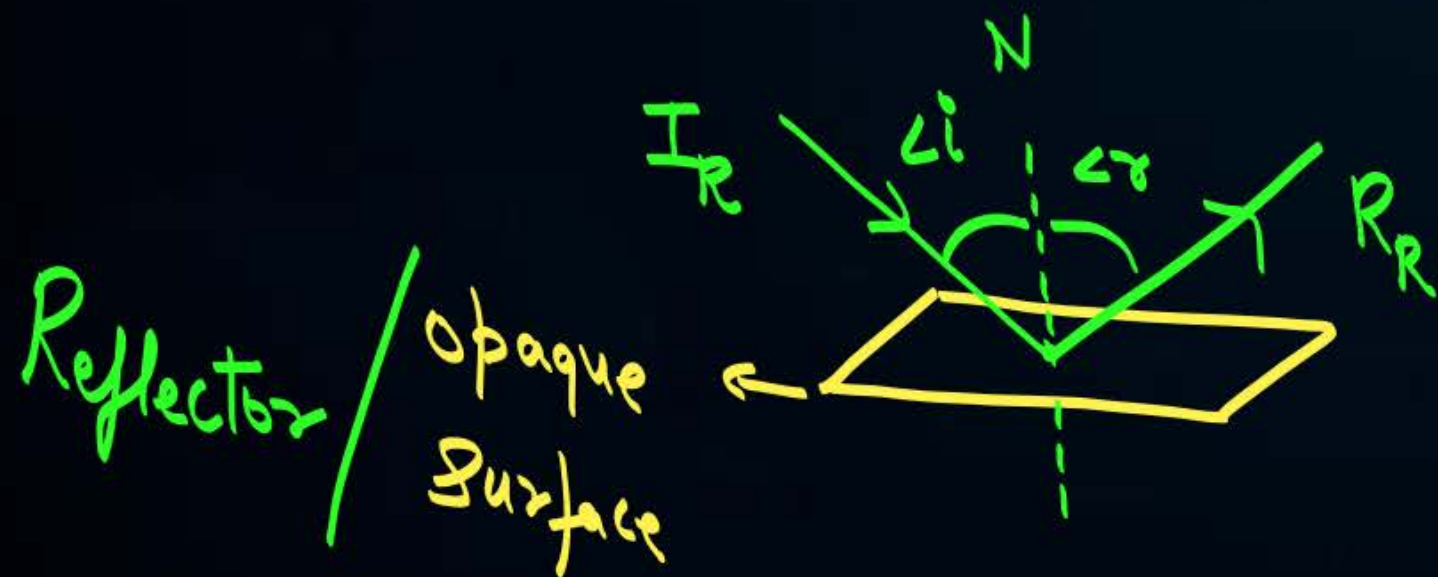


# Phenomenon of Light : Reflection

Opaque



- When a ray of light falls on a smooth polished surface and the light ray bounces back into the same medium, it is called the reflection of light.
- The incident light ray which lands upon the surface is said to be reflected away the surface. The ray that bounces back is called the reflected ray.
- The perpendicular which is drawn on the surface is called Normal.



- 1)  $\angle i = \angle r$
- 2)  $I_r, R_r, N$  lie on the same plane







# LAWS OF REFLECTION



The laws of reflection determine the reflection of incident light rays on reflecting surfaces, like mirrors, smooth metal surfaces, and clear water.

**The laws of reflection states that**

- The Incident Ray, the Reflected Ray and the Normal all lie in the same plane
- The Angle of Incidence ( $\angle i$ ) = The Angle of Reflection ( $\angle r$ )



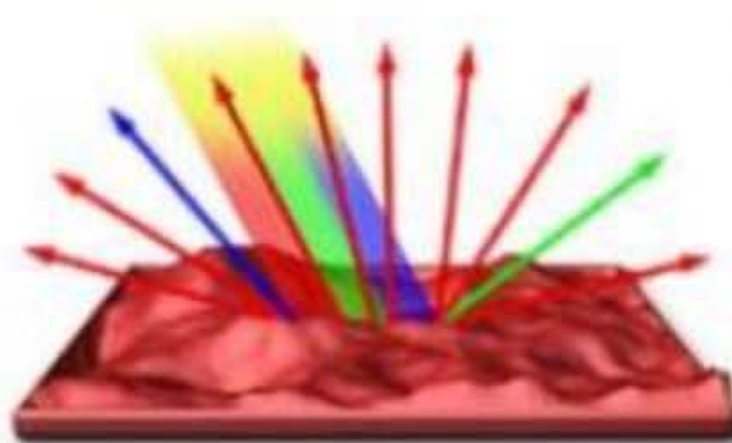
# Types of Reflection



Specular and Diffuse Reflection



Specular Reflection



Diffuse Reflection

Figure 1

→ Distorted image = Blur

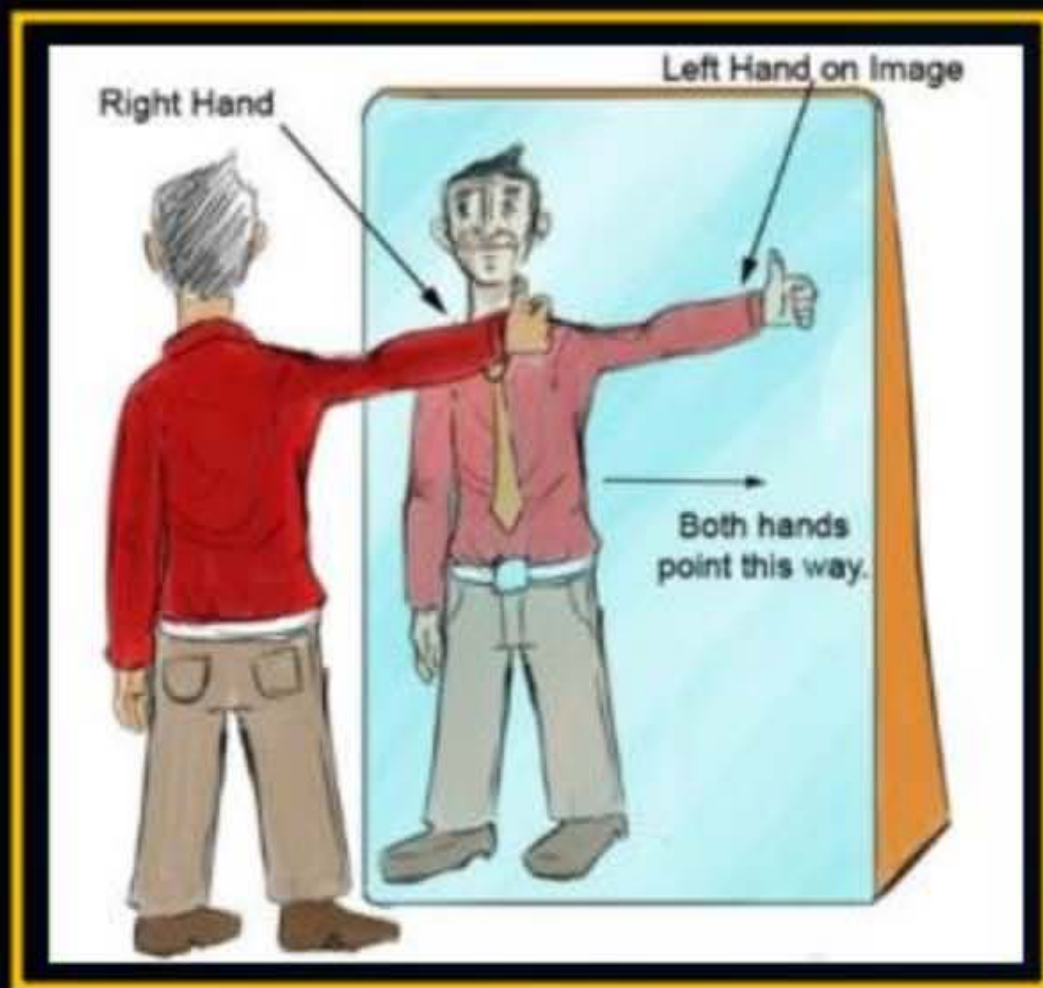








# Examples of Lateral Inversion

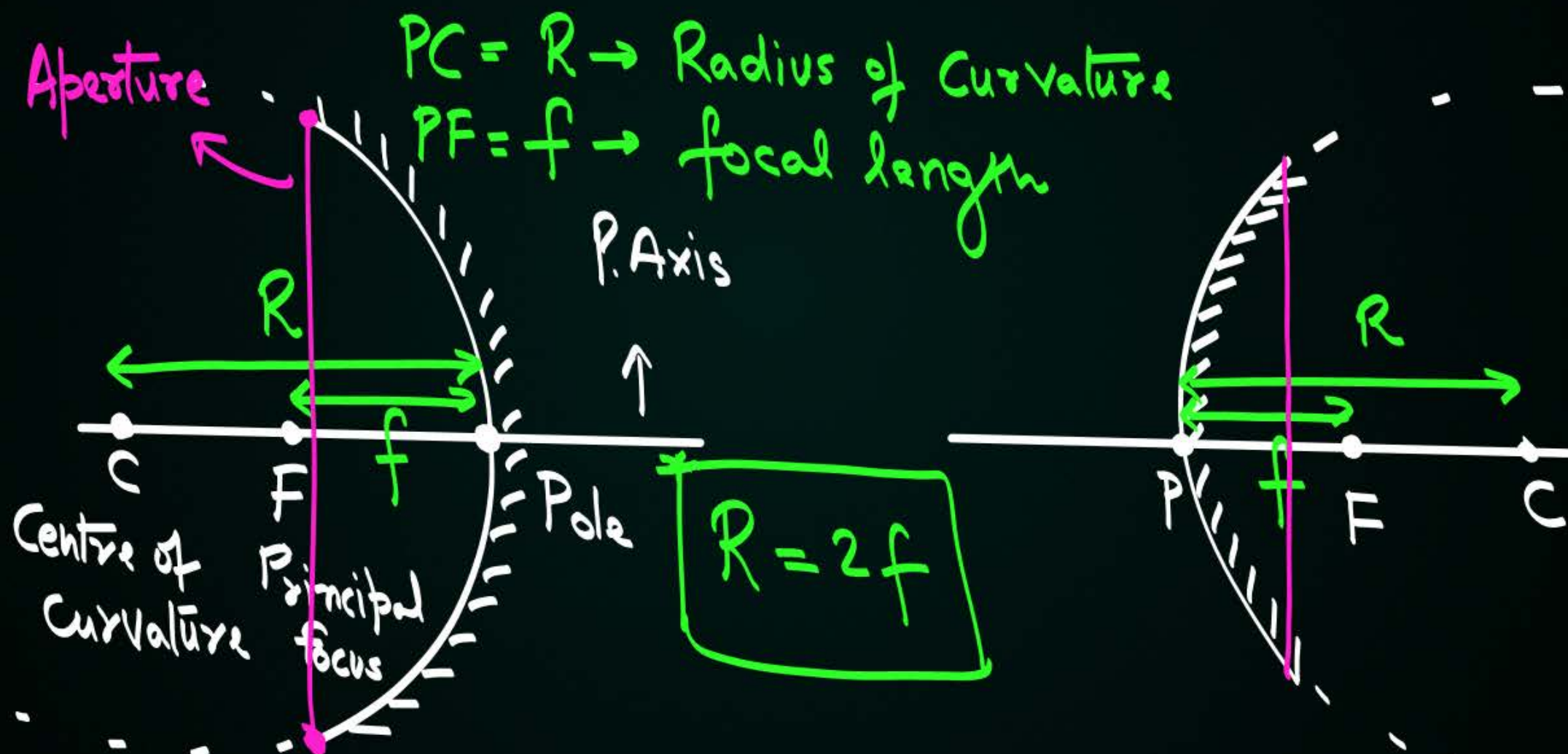




# \* Spherical Mirrors

1. Concave

2. Convex







## Important Terms : Spherical Mirrors



### SOME IMPORTANT DEFINITION :

1. **Centre of curvature** the centre of a hollow sphere of which the spherical mirror forms a part is called centre of curvature it is denoted by c.
2. **Radius of curvature** the radius of a hollow sphere of which the spherical mirror forms a part is called radius of curvature it is denoted by R.
3. **Pole** the midpoint of a spherical mirror is called pole it is denoted by P.
4. **Aperture** the part of a spherical mirror exposed to the incident light is called the aperture of the mirror.



C

P

5. **Principal axis** a line joining the centre of curvature and pole is called principal axis.

6. **Principal focus** a point on the principal axis of a spherical mirror where the rays of light parallel to the principal axis meet or appear to meet after reflection is called principal focus it is denoted by F.

7. **Focal length** the distance between the pole and principal focus of a spherical mirror is called focal length.

P

F

Lens

8. **Optical centre** it is a point on the principal axis of the lens such that a ray passing through goes undeviated.





## Rules to Obtain Image



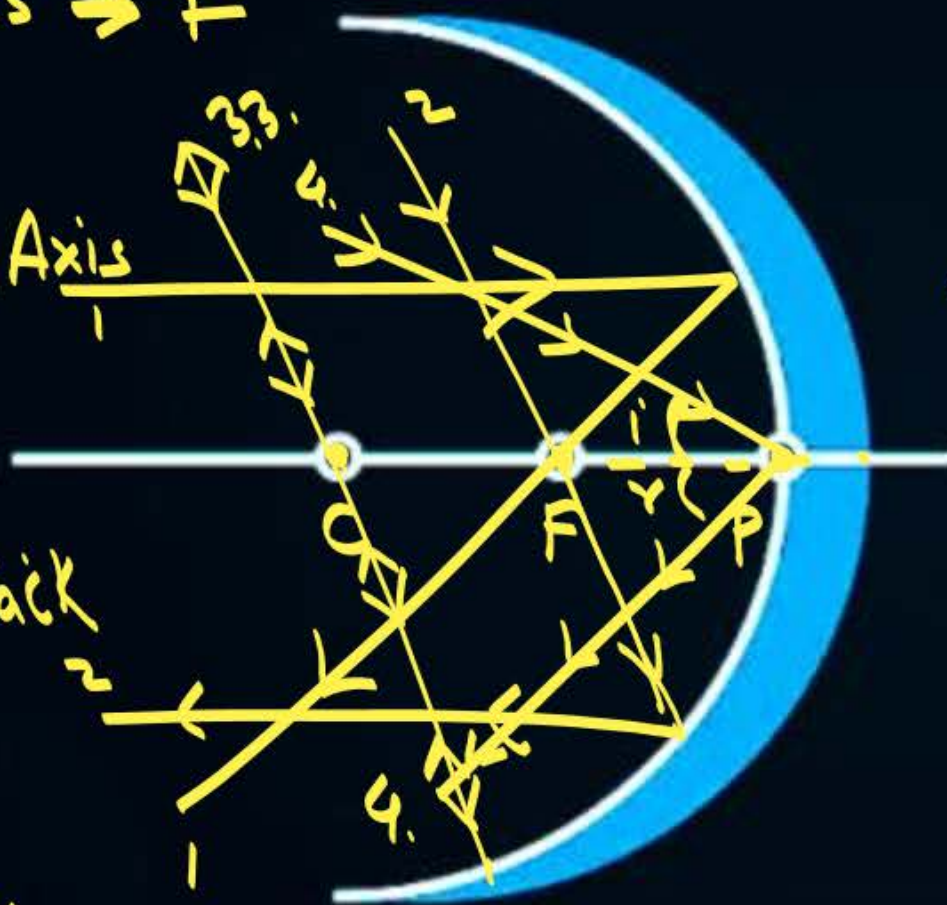
→ 1.  $\parallel$  to P. Axis  $\rightarrow F$

→ 2.  $F \rightarrow \parallel$  to P. Axis

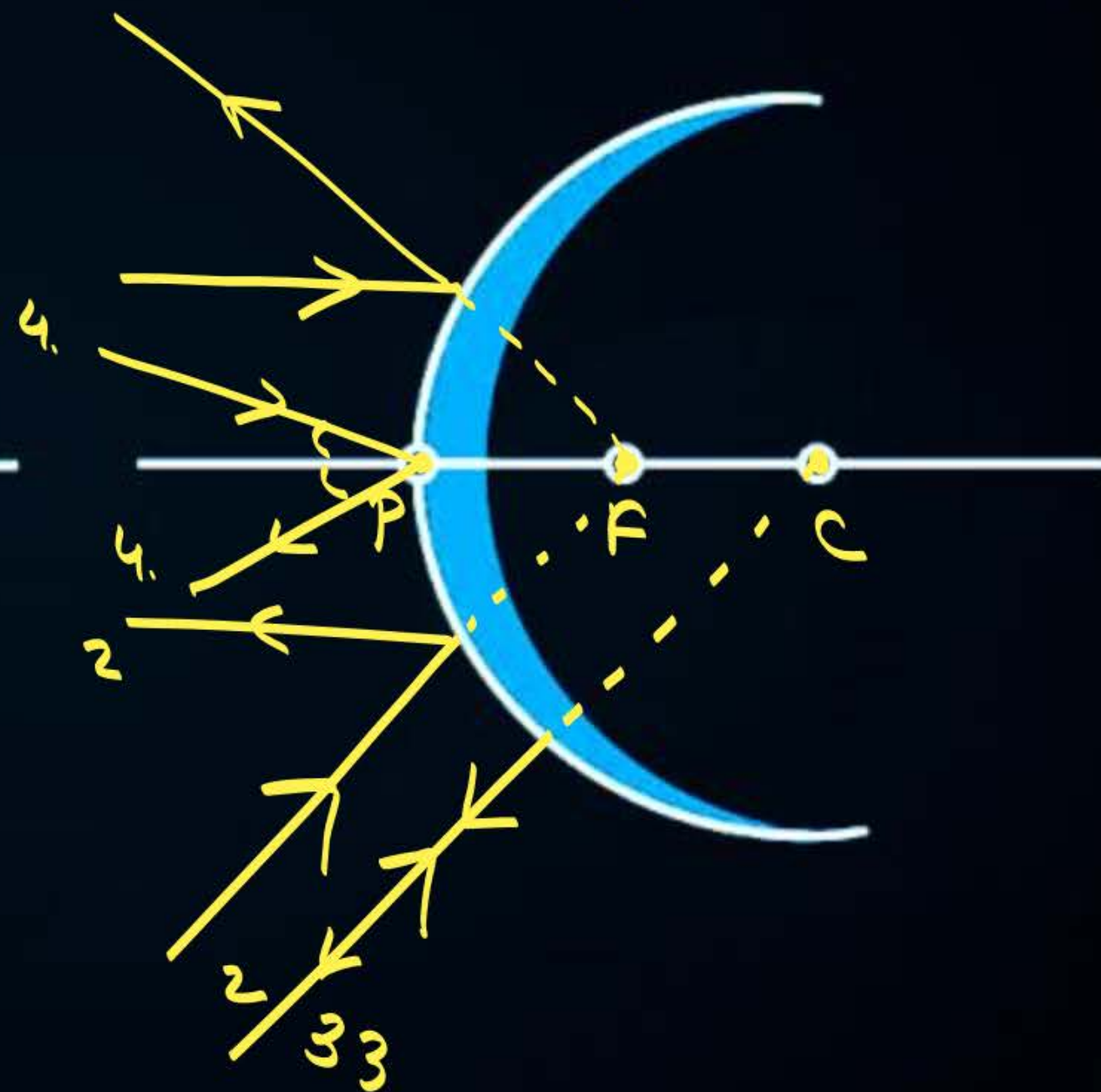
→ 3.  $C \rightarrow$  Back track

→ 4.  $P \rightarrow \angle i = \angle r$

Concave



Convex

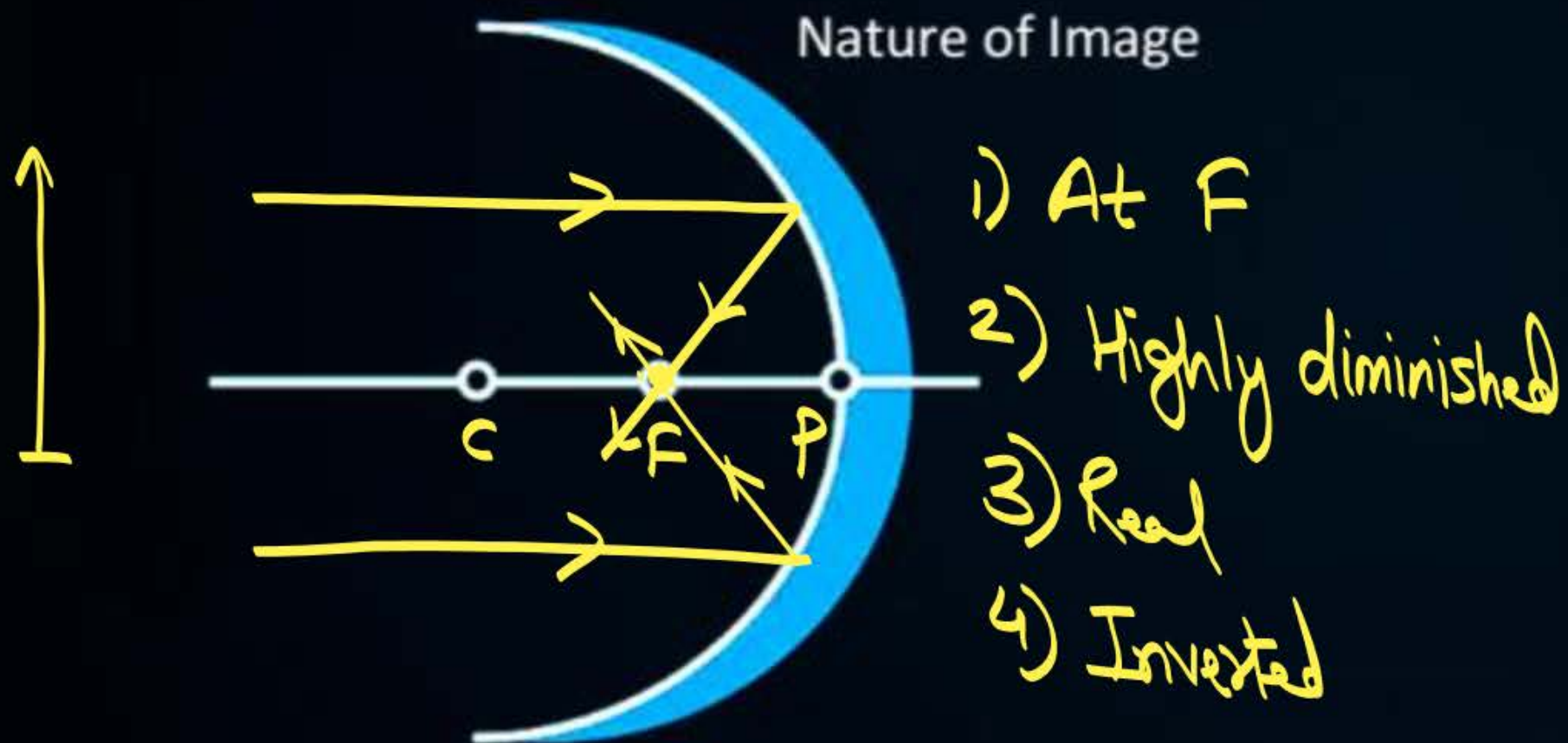




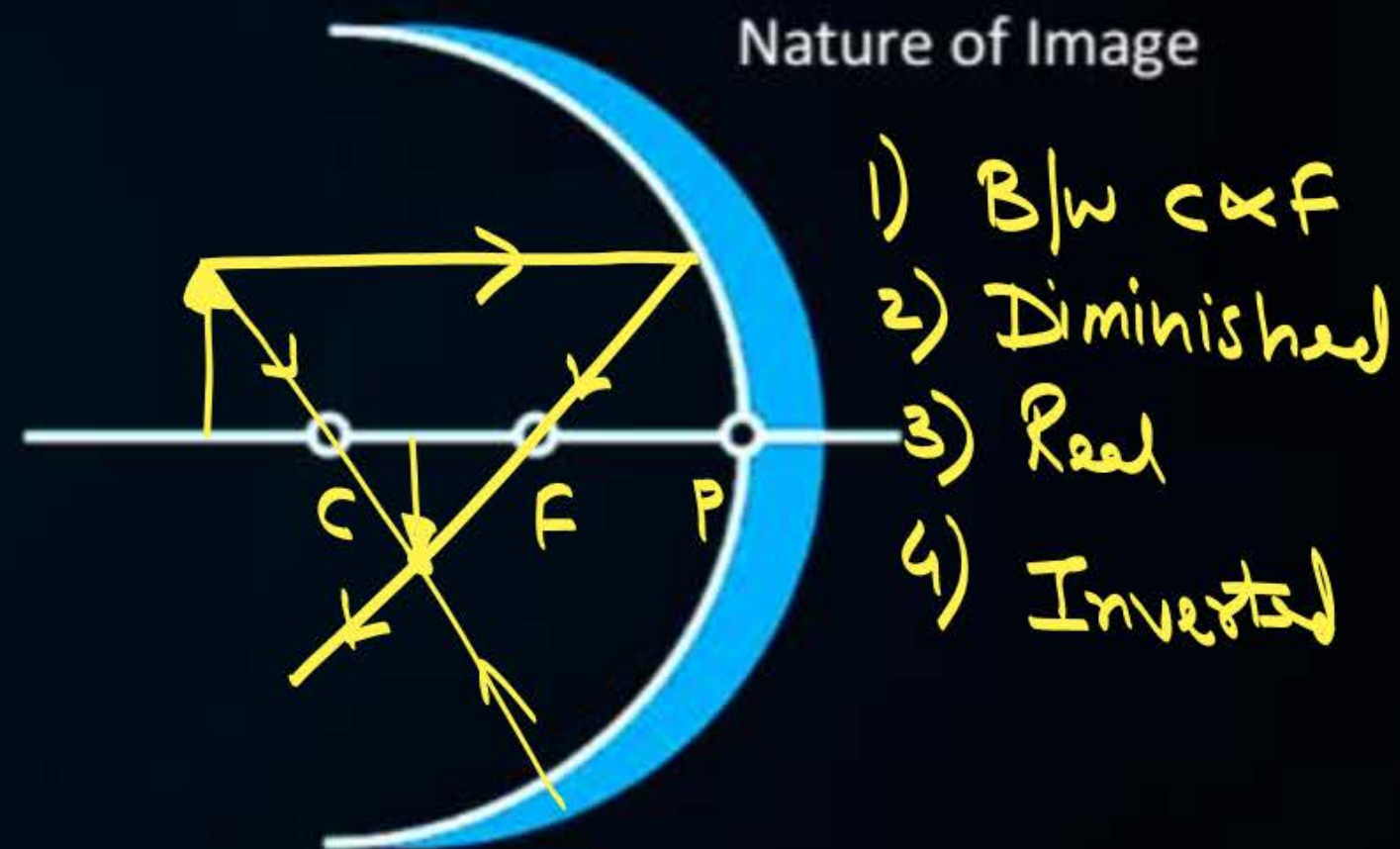
# Image Formation : Concave Mirror (1)



## 1. Object at Infinity



## 2. Object beyond C



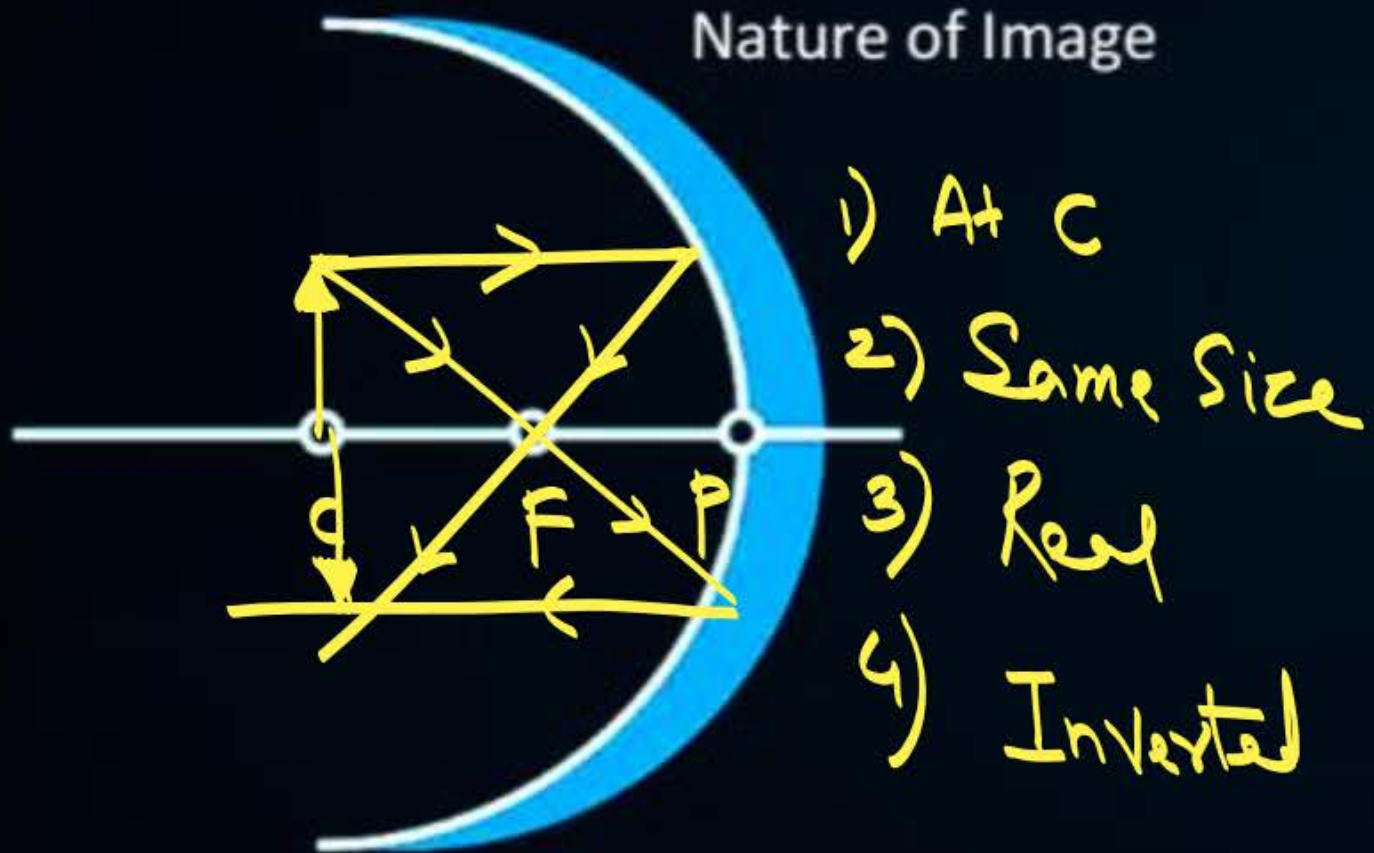




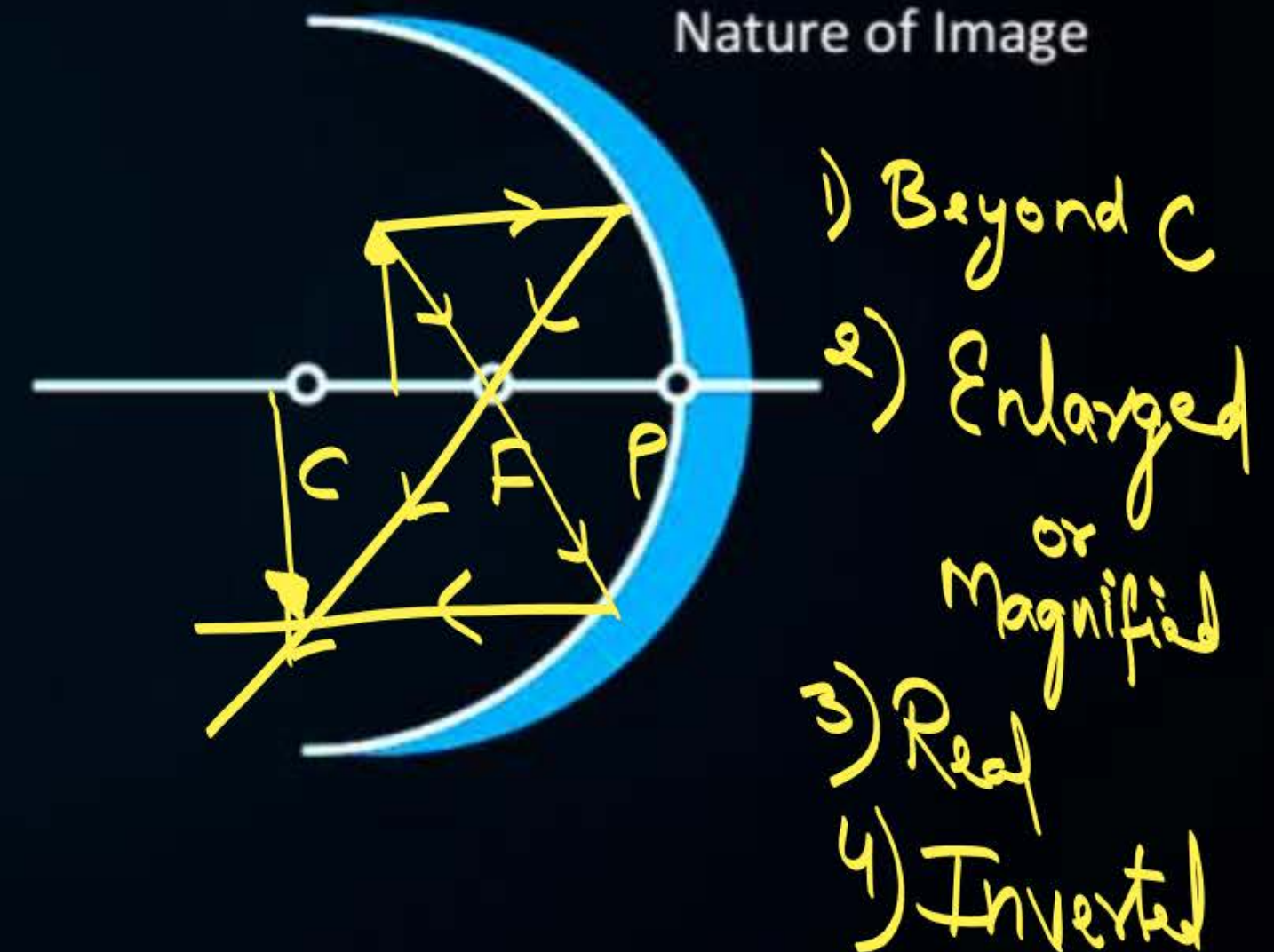
## Image Formation : Concave Mirror (2)



### 3. Object at C



### 4. Object Between C & F







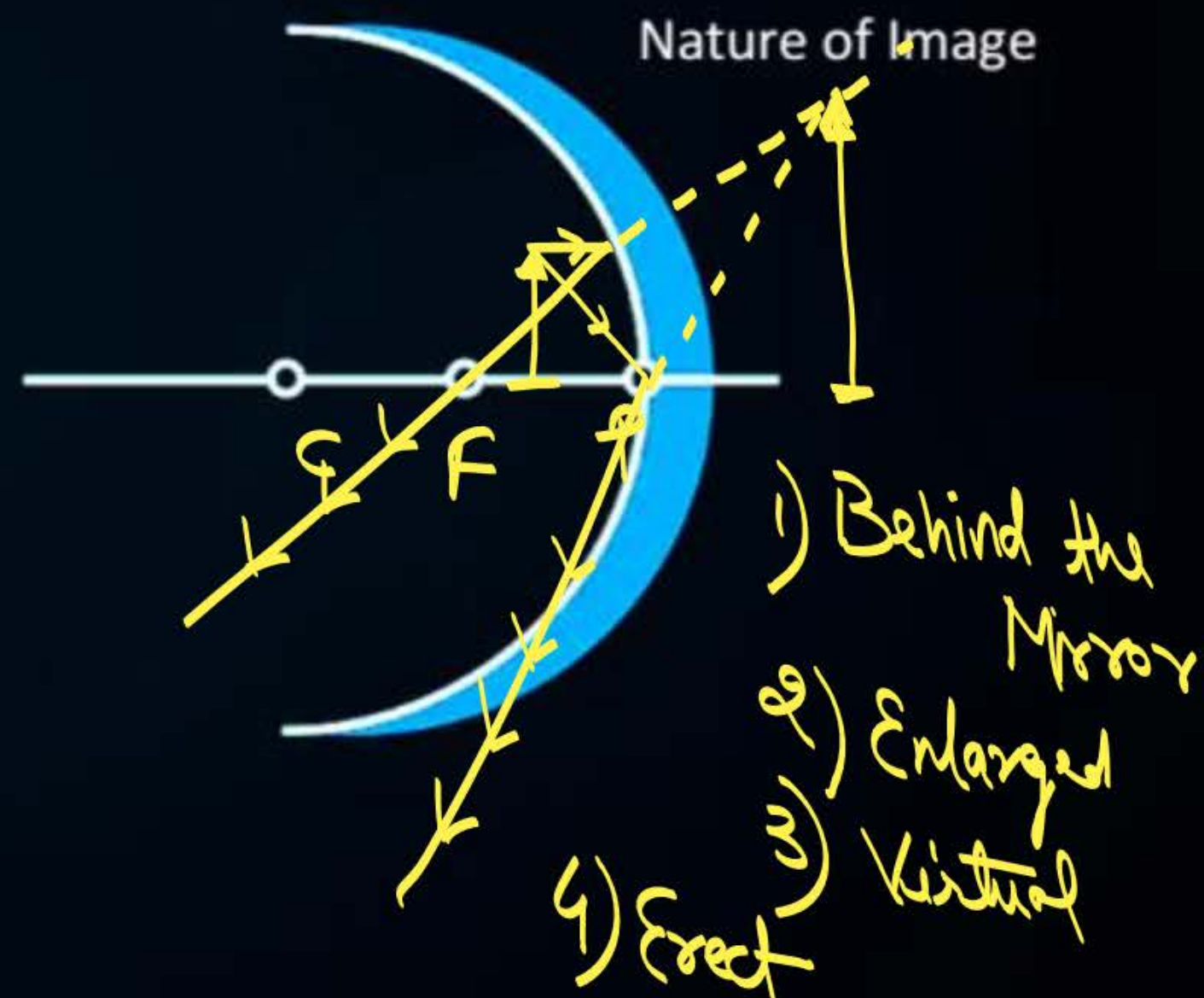
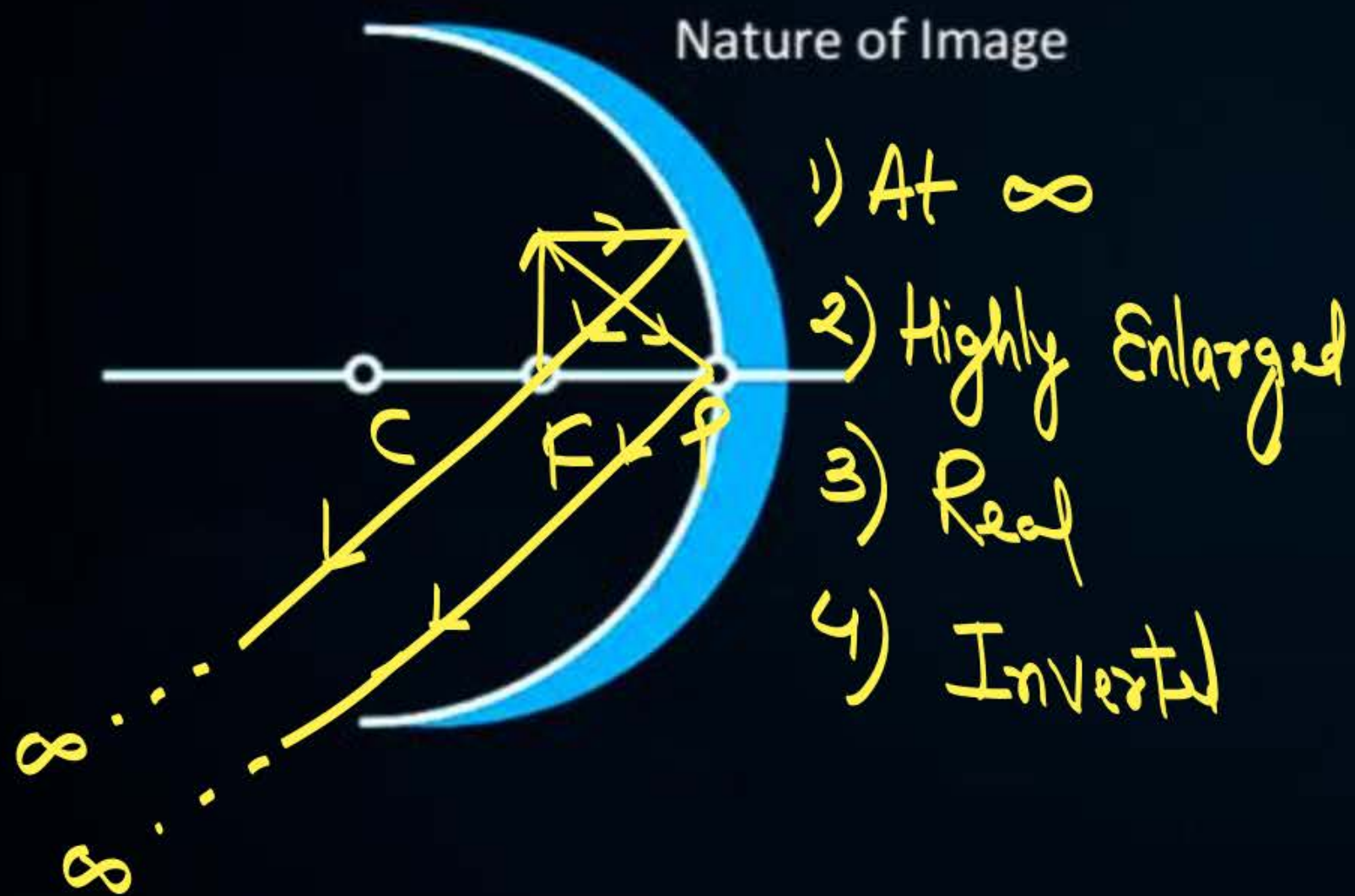
## Image Formation : Concave Mirror (3)



### 5. Object at F

### 6. Object Between F & P

V.V.I.P.





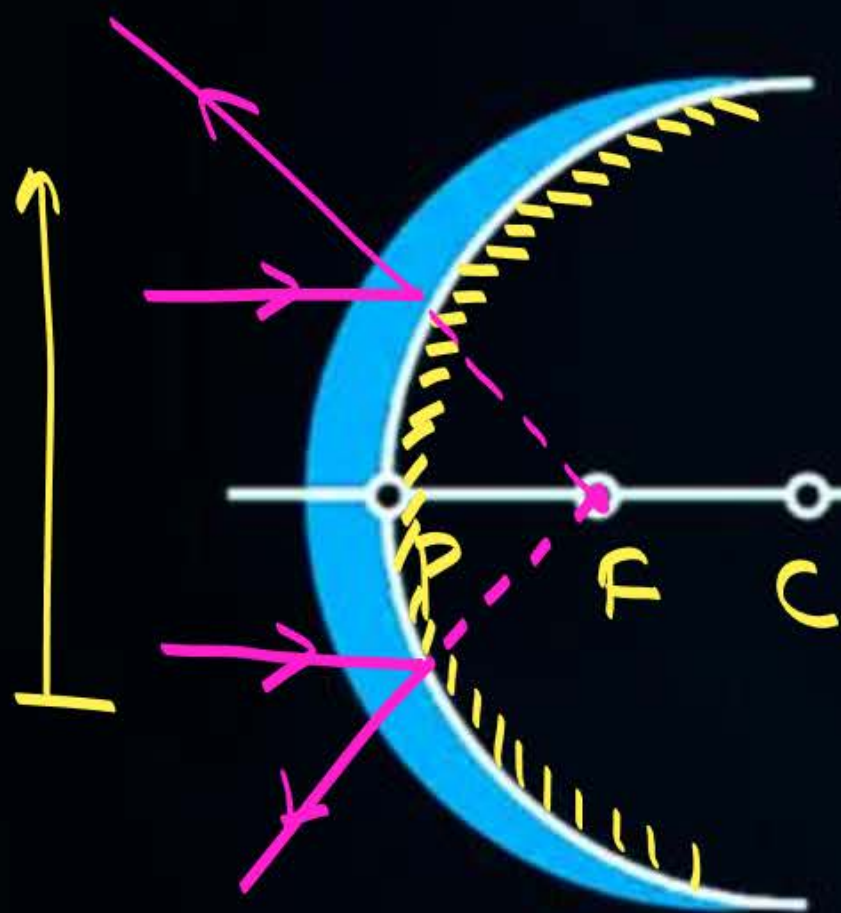


# Image Formation : Convex Mirror



VED  
+ + +

## 1. Object at Infinity



Nature of Image

- ① At F
- ② Highly diminished
- ③ Virtual
- ④ Erect

## 2. Object at Finite Distance ( $\infty \rightarrow P$ )



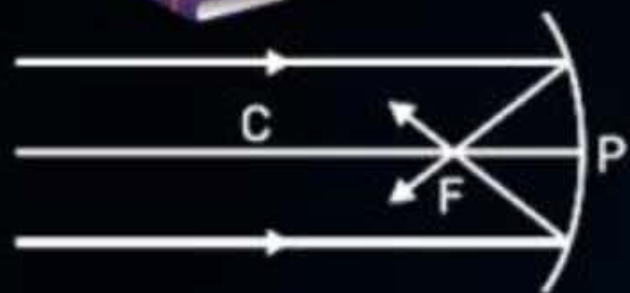
Nature of Image

- 1) B/w P and F
- 2) Diminished
- 3) Virtual
- 4) Erect

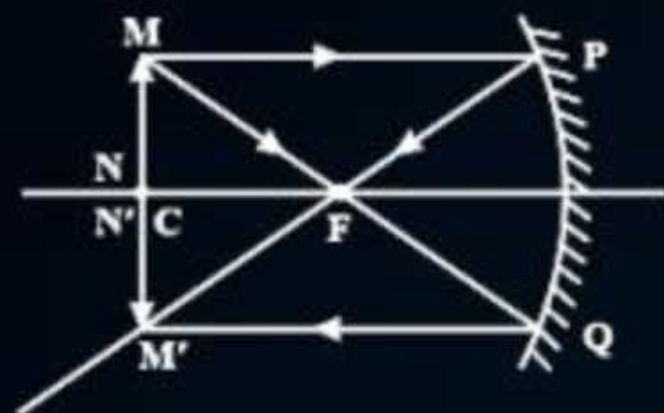




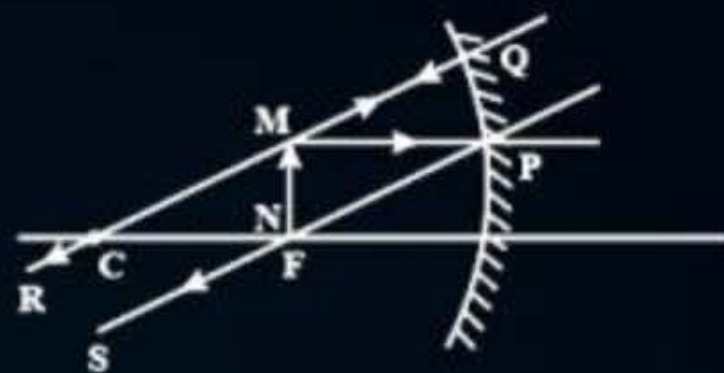
# All Ray Diagrams : Spherical Mirrors



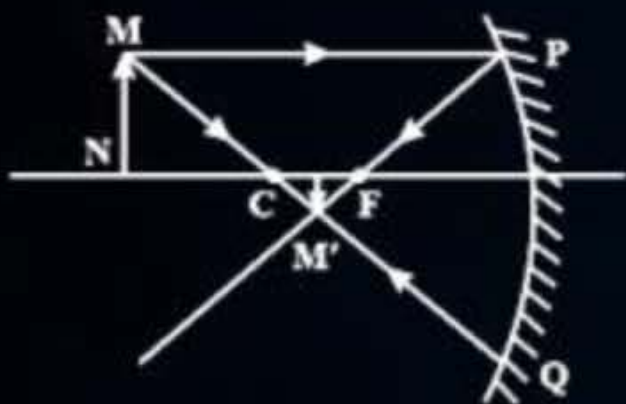
1. Object at Infinity



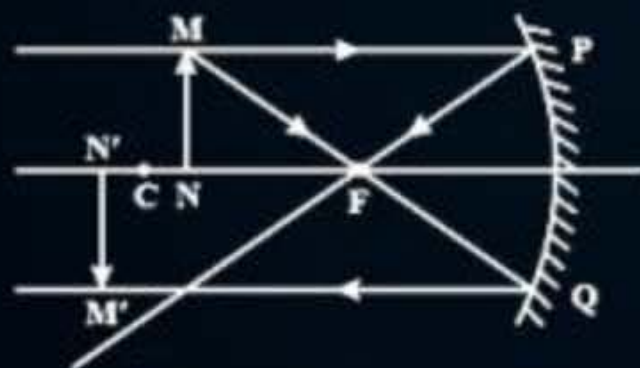
3. Object at C



5. Object at F



2. Object beyond C

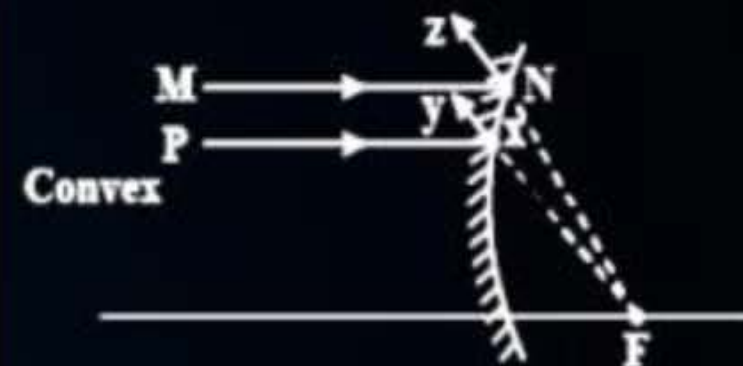


4. Object Between F and C

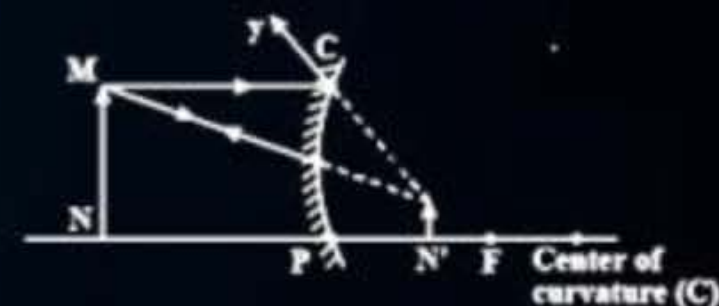


6. Object Between F and P

**Concave Mirror**



1. Object at Infinity



2. Object at Finite Distance

**Convex Mirror**



Concave → ← Convex



**Concave Mirror**



**Convex Mirror**



## Uses of Mirrors



→ Wide-field of View

### Convex Mirror



Street View



Rear-view



→ Parking lot / Metro station



### Concave Mirror



Shaving

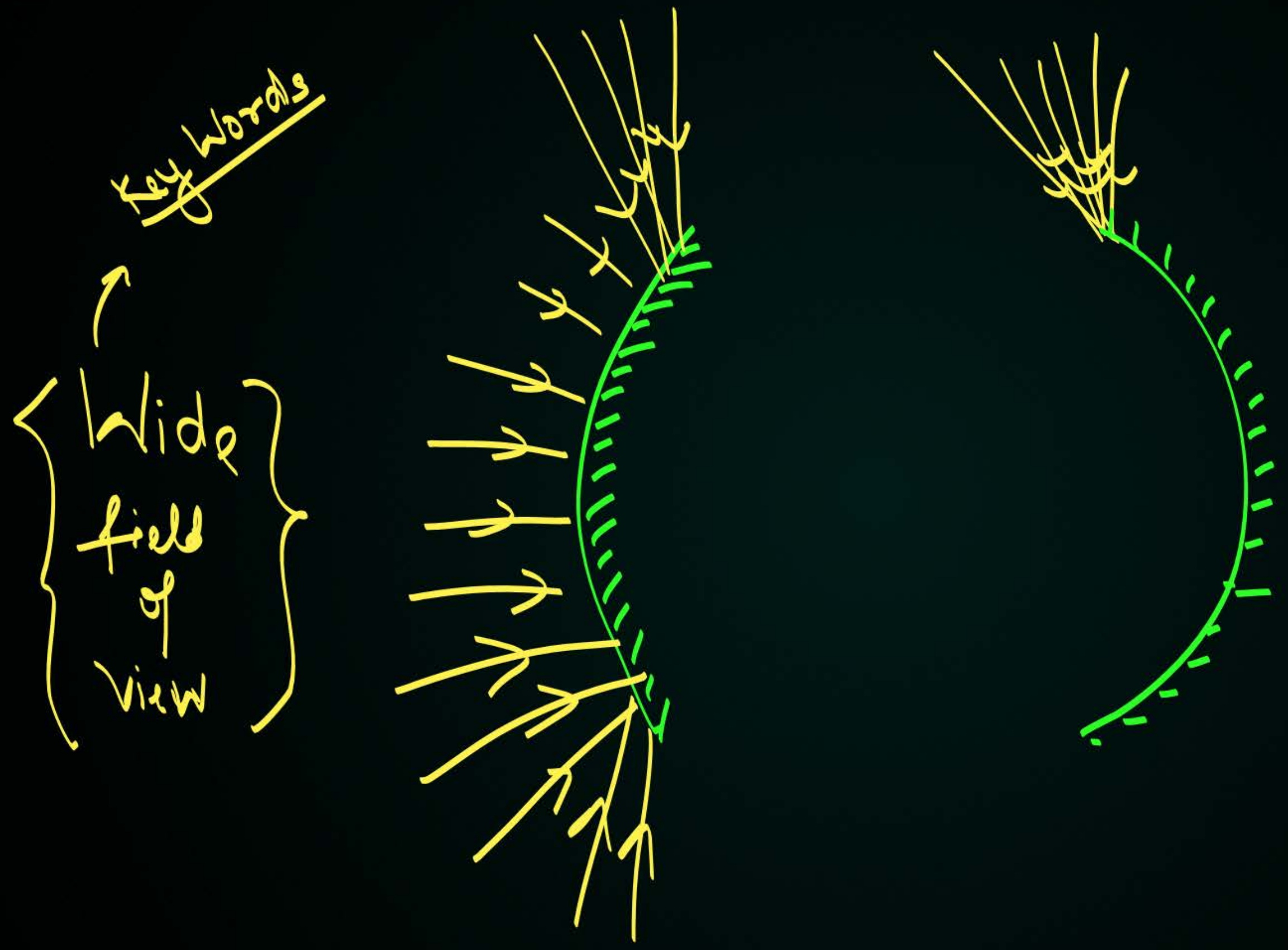


Makeup



Dentist







## Permanent HOMEWORK



→ Notes Regular Banane hain

→ Numerical Seekhne hain

⇓  
Ray Diagrams × 3 Bar Practice





THANK  
YOU

