

Questions

Q1 What are the differences between convex and concave mirrors?

Q2 Which type of mirror makes the image smaller?

Q3 Which type of mirror would you use in each situation?

- a) Make-up or shaving
- b) Security in a store
- c) Clothing store (to sell more clothes)

Q4 An object is 10.0 cm in front of concave mirror of focal length 15.0 cm. Solve for d_i , why is the answer negative?

Q5 An image forms in front of the concave mirror at the same distance as the object. Solve for d_o or d_i in terms of f .

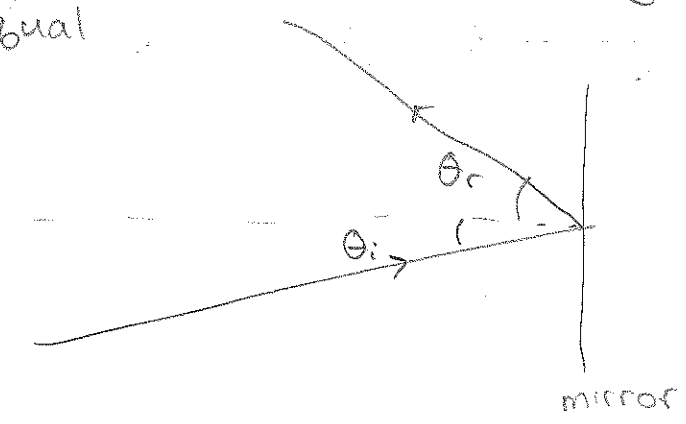
Physics II

Unit 7.4

Curved Mirrors

Review

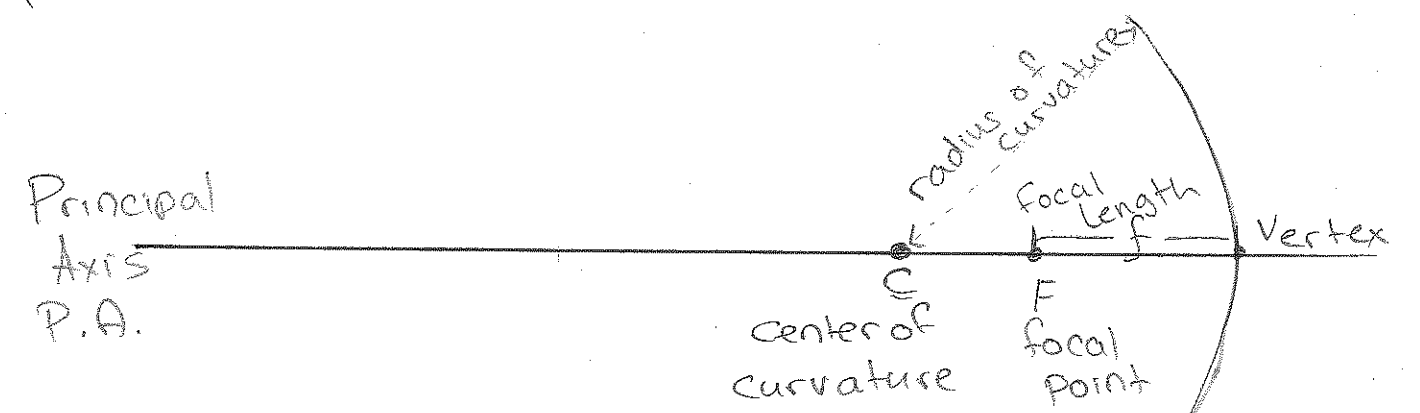
- Angle of incidence (θ_i) and Angle of reflection (θ_r) are equal



Concave mirrors - curve inward ("cave" in)
Convex mirrors - bulge outward (like on trucks)

New

Concave Mirrors



• Any ray of light passing through the focal point will reflect parallel to the P.A.

• Any ray of light hitting the mirror parallel to P.A. will reflect through the focal point

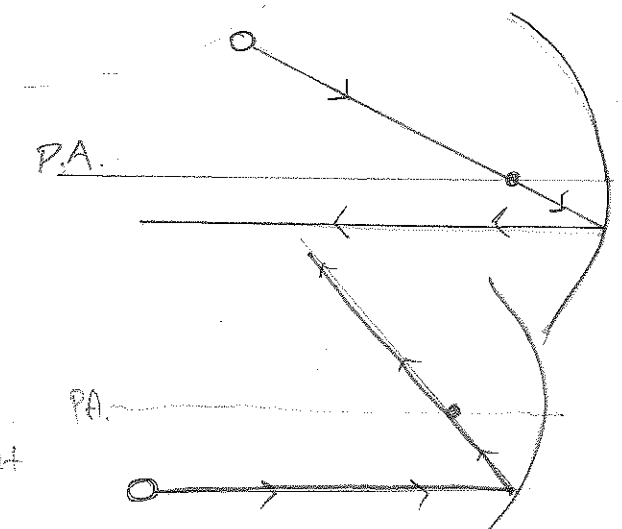
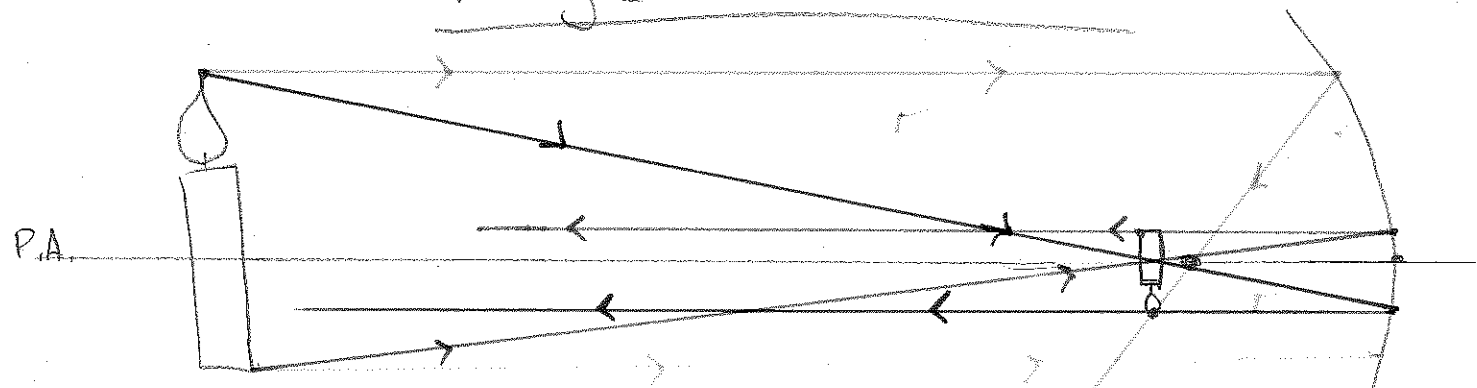


Image of a Candle



• An object placed between the focal point and a concave mirror will produce a magnified virtual image.

• The ideal shape of a concave mirror is a parabola.

Mirror Equation

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

d_o = distance of object to the mirror

d_i = distance of image to the mirror

f = focal length.

Example

A concave mirror has focal length of 20.0cm. If an object is placed 1.00m away from the mirror, where will the image form?

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

$$\frac{1}{100\text{cm}} + \frac{1}{d_i} = \frac{1}{20.0\text{cm}}$$

$$\frac{1}{d_i} = \frac{1}{20.0\text{cm}} - \frac{1}{100\text{cm}}$$

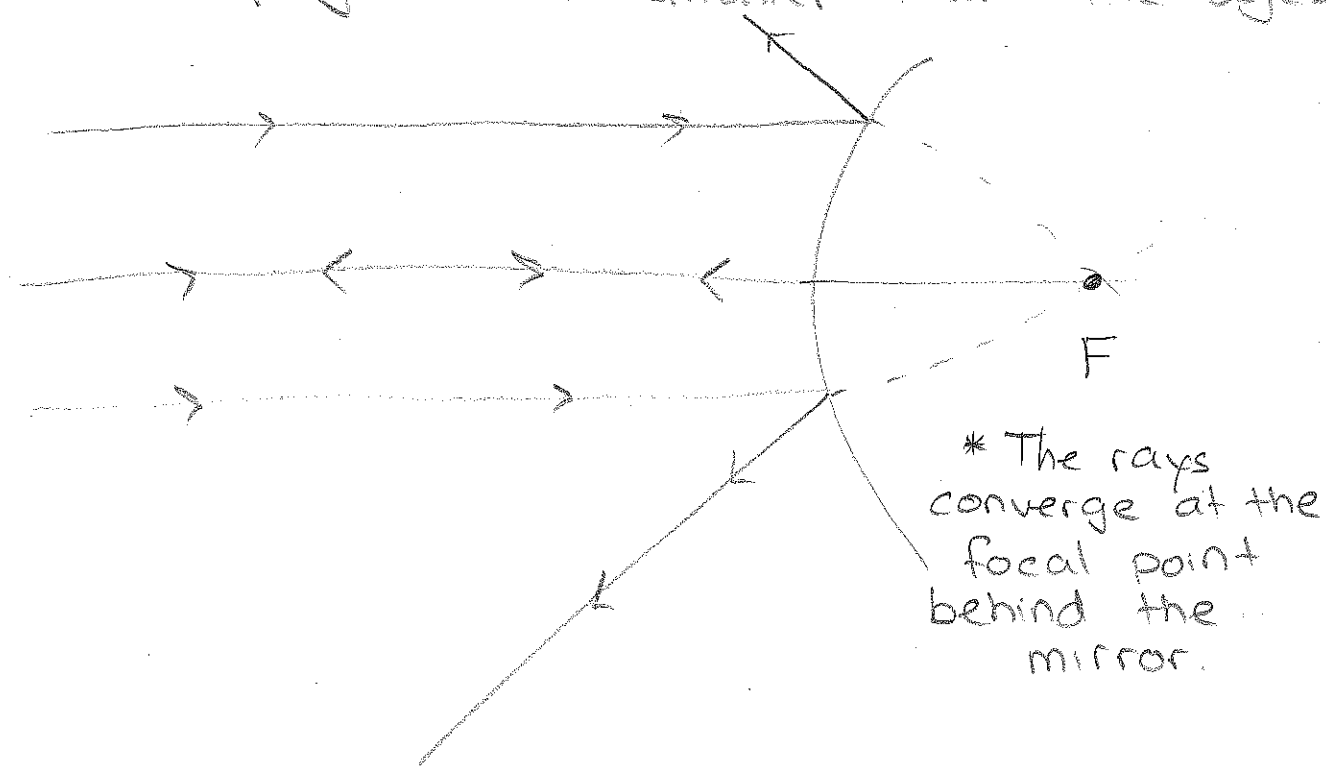
$$\frac{1}{d_i} = \frac{5}{100\text{cm}} - \frac{1}{100\text{cm}}$$

$$\frac{1}{d_i} = \frac{4}{100\text{cm}} = \frac{1}{25.0\text{cm}}$$

$$d_i = 25.0\text{cm}$$

Convex Mirrors

• A convex mirror produces a virtual image that is upright and smaller than the object.



* The rays converge at the focal point behind the mirror.