

CONCEPT: RAY DIAGRAMS FOR CONVEX MIRRORS

- When light hits a convex mirror, reflected light *diverges* _____ from F.
 - These ALWAYS produce a **virtual image** where the rays *appear* to come from behind the mirror.

EXAMPLE: An object is placed 10cm in front of a convex mirror with a focal length of 6cm. Draw a principal-ray diagram. What is the position of the image?

RAY DIAGRAMS FOR CONVEX MIRRORS

Draw any 2: {

1) P-ray: Parallel to axis, then reflects *away* from F

2) F-ray: Draw *towards* F, then parallel to axis

3) C-ray: Draw *towards* C, perfectly reflects back

SIGN RULES FOR MIRRORS

$d_o > 0$ if object on same side as **IN**bound rays
 $d_i > 0$ if image on same side as **OUT**bound rays
 $f > 0$ if F on same side as **OUT**bound rays

(Always use signs for KNOWN quantities)

$f = \underline{\hspace{2cm}}$

Type	[REAL VIRTUAL]
Orientation	[UPRIGHT INVERTED]
Size	[REDUCED ENLARGED]

PRACTICE: The sideview mirrors on the sides of vehicles are convex mirrors. If a car is 18m from your passenger-side mirror, but produces an image 54cm behind the mirror, what is its radius of curvature?

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GEOMETRIC OPTICS

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

$$m = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

EXAMPLE: You place a coin with height of 2.0cm near the convex side of thin silvered-glass ball (which can be treated as a convex mirror) that has a diameter of 32.0cm. The image of the coin forms 3.0cm behind the glass shell. How far is the coin from the mirror? Determine the size and orientation of the image and whether it's real or virtual.



EXAMPLE: A convex mirror has a focal length of -10cm . If the height of the image is exactly half the height of the object, what is the distance from the object to the mirror?

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