CONCEPT: RAY DIAGRAMS FOR CONVEX MIRRORS

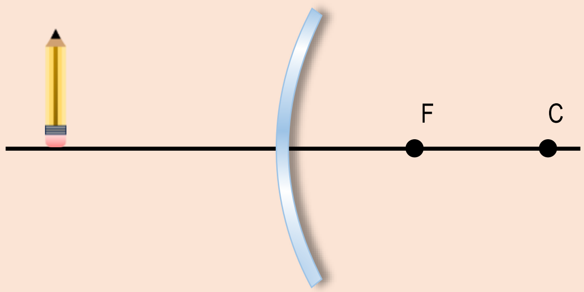
● When light hits a convex mirror, reflected light *diverges* ______ from F.

- 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**: **P**arallel 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 = ______

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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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)

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?

SIGN RULES FOR MIRRORS
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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)

GEOMETRIC OPTICS

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

$$m = \frac{h_i}{h_O} = -\frac{d_i}{d_O}$$