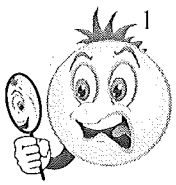
Name Key Hour _____



# MIRROR Notes

Light travels in a straight line until it strikes the surface of an object. It is then either: reflected, absorbed, or transmitted through (glass, lens)

Reflection: Light changes direction by bouncing off an object
Shiny objects (like mirrors) reflect 90-95% of light that hits them.

**Mirrors:** objects with a reflective surface

We will draw objects looking in the mirror like this: ↑

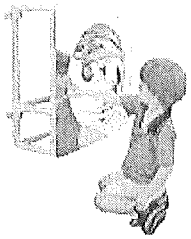
**Flat Mirror:** See image that looks like it is behind the mirror

Concave Mirror: Mirror surface "caves in" or curves inward

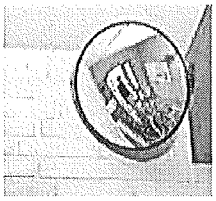
Ex: makeup mirror (magnification)

How do things look in a concave mirror?

| Far away | Closer | Up close |
|---|---|---|
| inverted | blurry- no image | larger, upright magnified |



Convex Mirror: Mirror surface curves outward or "bulges"



Ex: carside Mirror

How do things look in a convex mirror?

| Far away | Closer | Up close |
|---|---|---|
| smaller, upright (erect) | → | |

Principle Axis – Dotted line through center of mirror

focal point **(f)** – The point where light rays focus (inside mirror if a sphere) **Also called the focus**

Focal length – Distance from mirror to focal point

Real Image – Occurs when actual light rays cross-**can be projected** onto a screen. (Only concave mirrors make real images...and only sometimes!)

Virtual Image – Image that appears drawn behind the surface of the mirror. (Actual light rays don't cross behind the mirror, just looks like it)

Name _____ Hour _____ 1

# Concave Mirrors

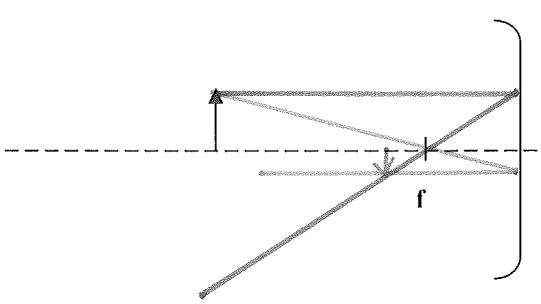
Ray Diagram _____ Drawings that locate an image formed by a mirror

**Rules for drawing ray diagrams for concave mirrors: Pick 2 light rays.**

1) A light ray traveling parallel to the principle axis on the way to the mirror bounce back through the focal point *("parallel, through the focus")*
2) A light ray passing through the focal point on the way to the mirror will bounce back parallel to the principle axis *("through the focus, parallel")*

**Draw the ray diagrams for the following examples.**

**Concave Mirror Ex. 1: object located beyond C**

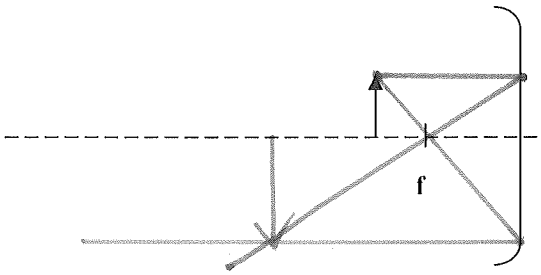



**Smaller or larger**

**Inverted or upright**

**Real or Virtual**

**Concave Mirror Ex. 2: object located between C & f**

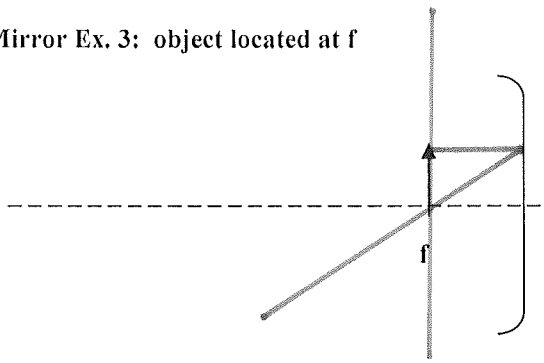



**Smaller or larger**

**Inverted or upright**

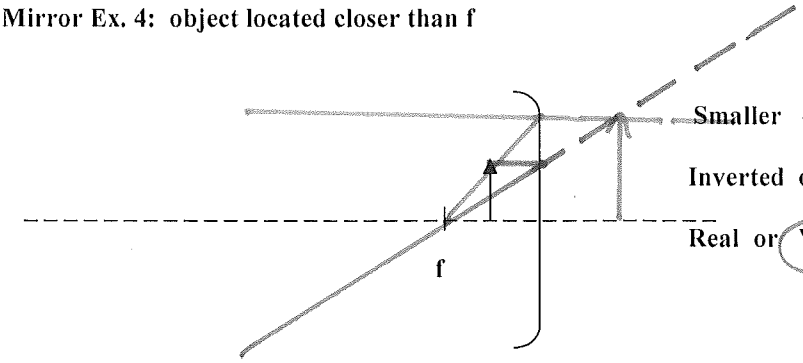
**Real or Virtual**

**Concave Mirror Ex. 3: object located at f**




no image
Blurry

**Concave Mirror Ex. 4: object located closer than f**




**Smaller or larger**

**Inverted or upright**

**Real or Virtual**

Name _____ Hour _____ 1

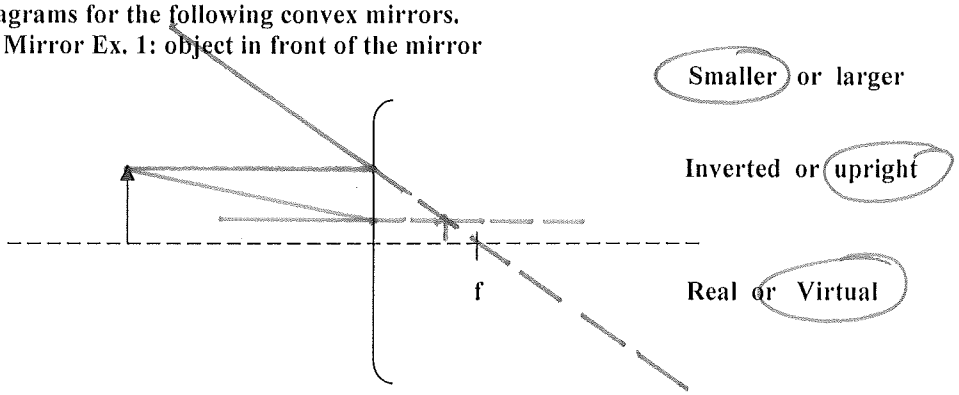
# Convex Mirrors

**Rules for drawing ray diagrams for convex mirrors: Pick 2 light rays.**

1) A light ray traveling parallel to the principle axis on the way to the mirror will reflect in a manner so that its extension will pass through the focal point.
2) A light ray passing through the focal point on the way to the mirror such that an extension passes through the focal point will reflect and travel parallel to the principle axis

**Draw the ray diagrams for the following convex mirrors.**

**Convex Mirror Ex. 1: object in front of the mirror**

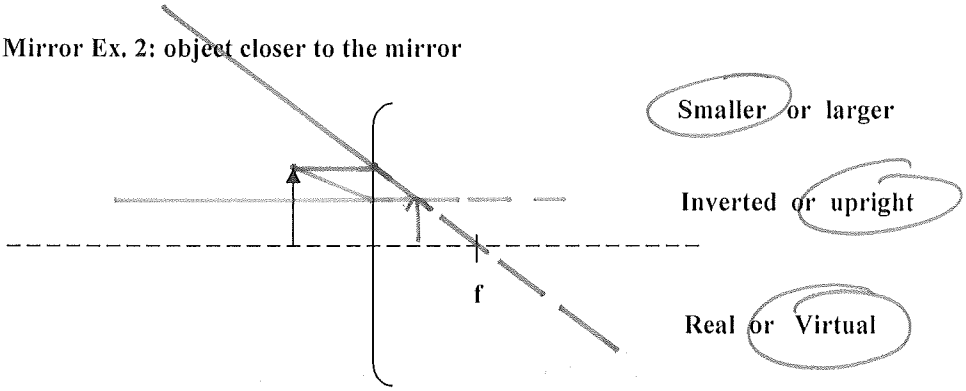



**Smaller** or larger

Inverted or **upright**

Real or **Virtual**

**Convex Mirror Ex. 2: object closer to the mirror**




**Smaller** or larger

Inverted or **upright**

Real or **Virtual**

**The Variables for Mirrors:**

**All distances are measured from the mirror on the principle axis!***

**f* = *You can use meters or centimeters as long as they are all in the same unit!*

**f** = **focal length**
**p** = **object distance from mirror**
**q** = **image distance from mirror**
**$h_o$** = **object height**
**$h_i$** = **image height**

**Sign Conventions for the variables-**

When the image is in **front of** the mirror **q** is **positive** / negative

When the image is **behind** the mirror **q** is positive / **negative**

When objects are **upright**, $h_i$ is **positive** / negative

When the image is **inverted** $h_i$ is positive / **negative**