

Phys 2120-4

11/16/12

Note Title

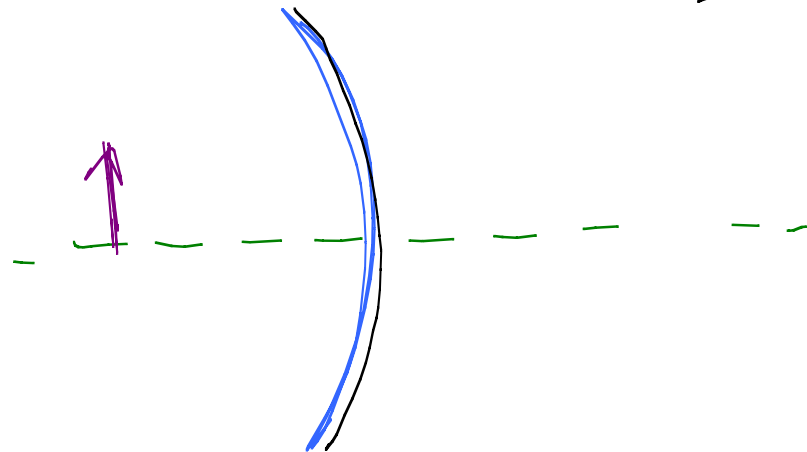
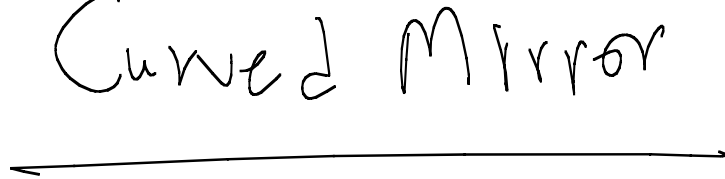
11/16/2012

Plane mirror:

Find image

Plane: Virtual
mirror image

Curved Mirror



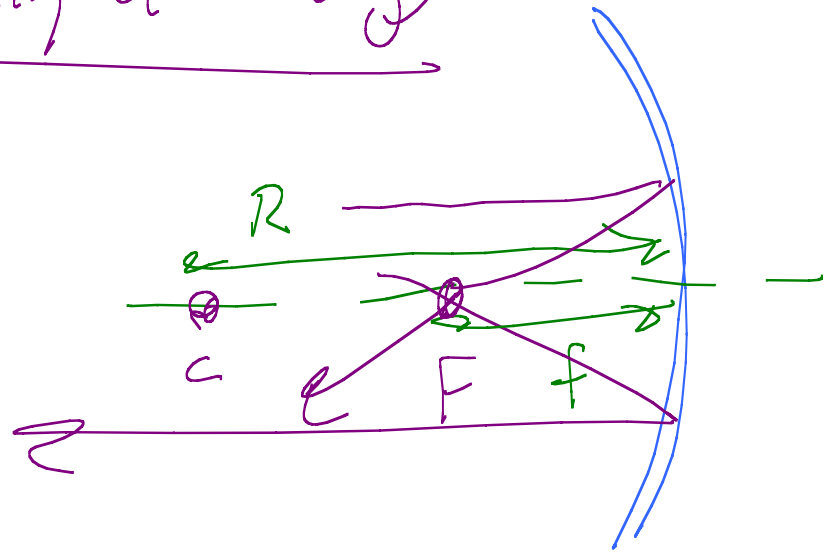
Rules for dealing w/ light rays

1. Ray parallel to axis
reflects thru focal
point

2. Ray thru focal point
goes thru focal point

3. Ray hitting vertex reflects sym'ly $R = 2f$

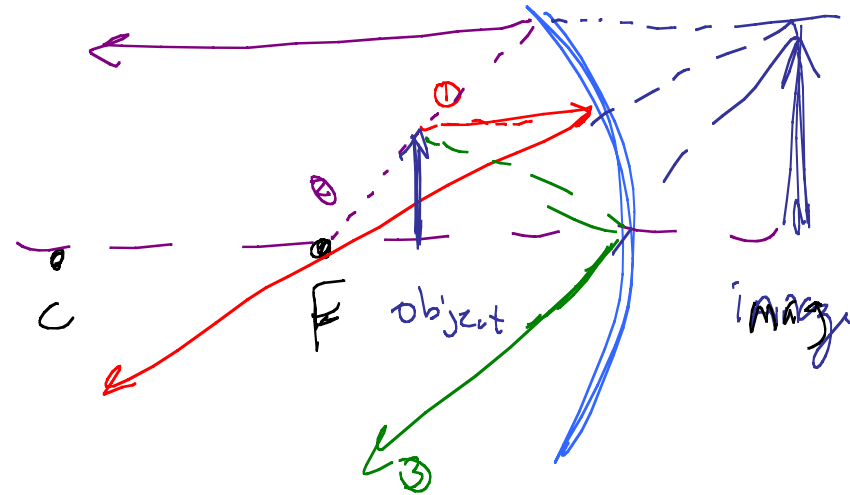
4. Ray thru center of curvature goes back on itself.



Concave Mirror

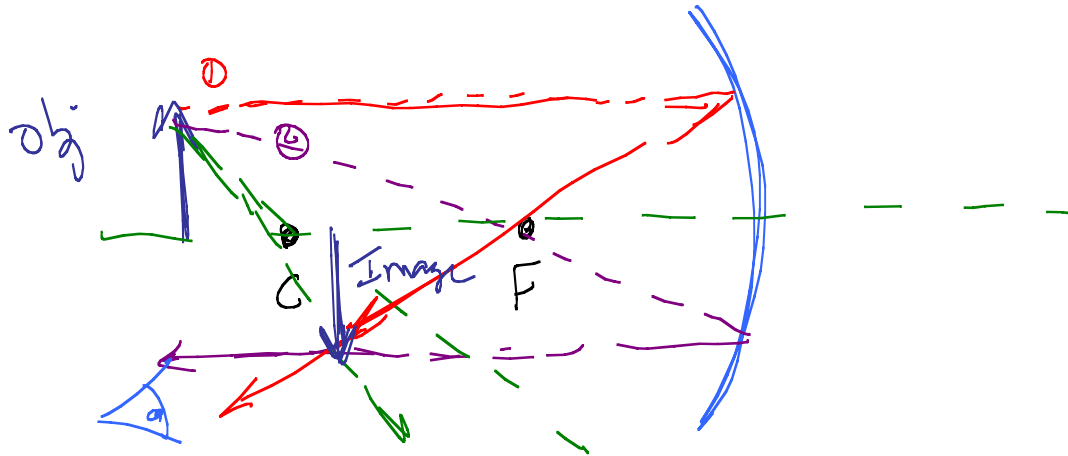
a) ^{close}
Image

Virtual, Upright, Bigger

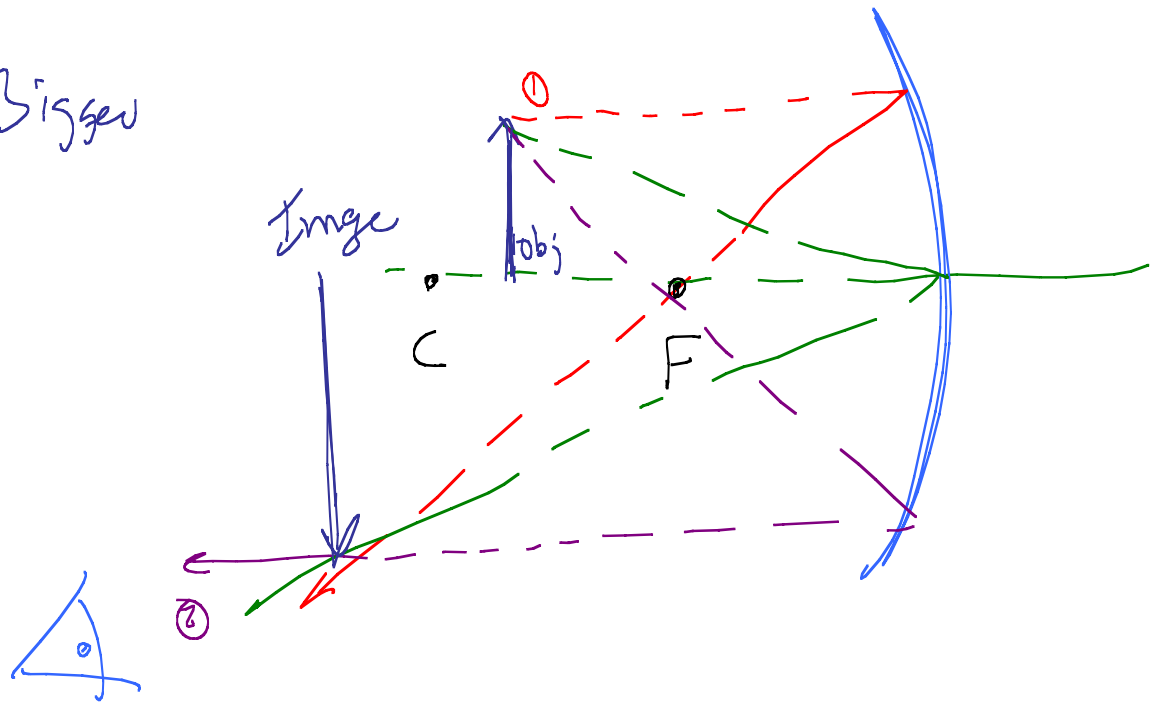


b) F_o

Image is real
Inverted smaller?



c) Intermediate
Real, Inverted, Bigger

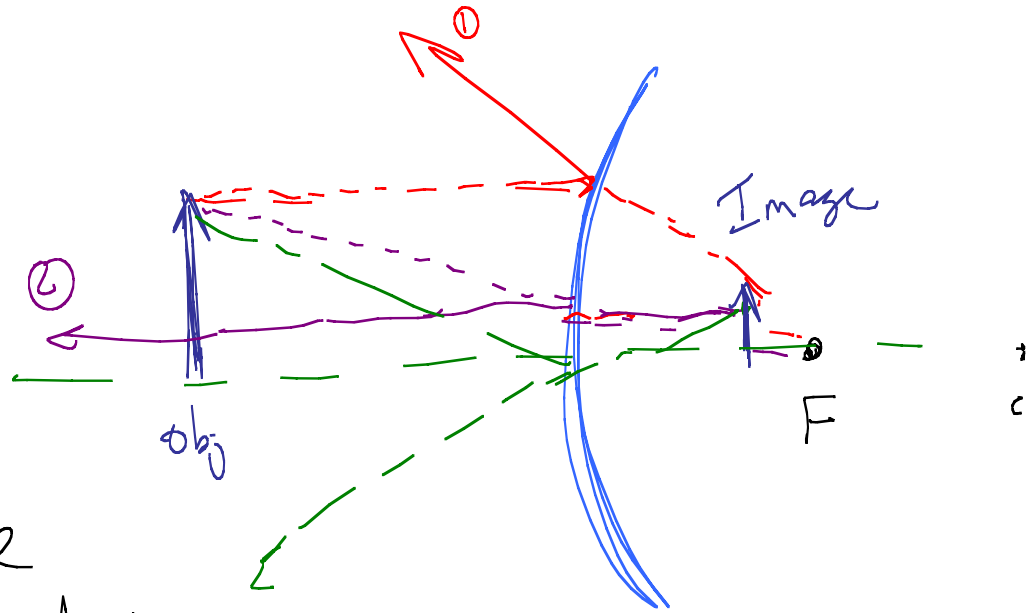


Convex Mirror

Image Virtual, upright
smaller.

→ Useful for wide-angle
view of room, MC Escher

Equation for all of this

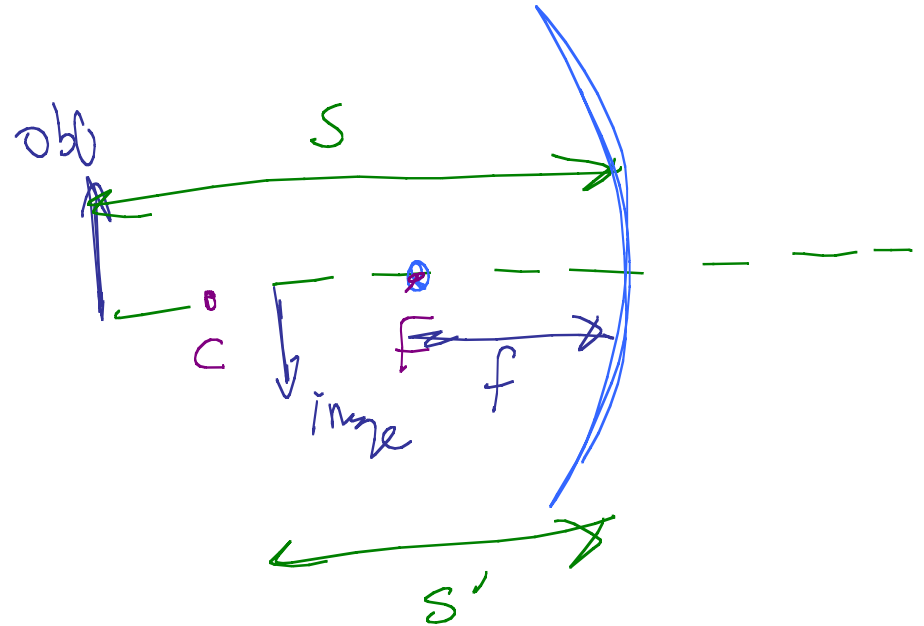


Sign conventions:

Left / Right

S dist to obj
pos if obj is on left \leftarrow
— if obj is on right

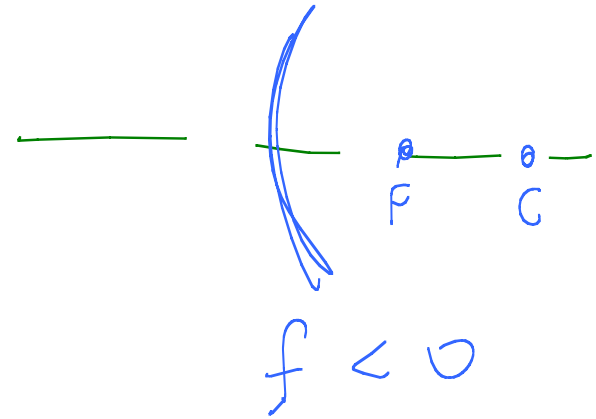
S' dist to image
pos if image in front (left)
neg if image in back (right)



$f =$ pos if concave
neg if convex

Mirror eqn:

$$\frac{1}{s} + \frac{1}{s'} = \frac{1}{f}$$



- 31.18 Candle is on axis of a
15 cm focal length concave mirror.
36 cm from mirror. a) where is image
b) How do sizes compare c) Real or virtual?

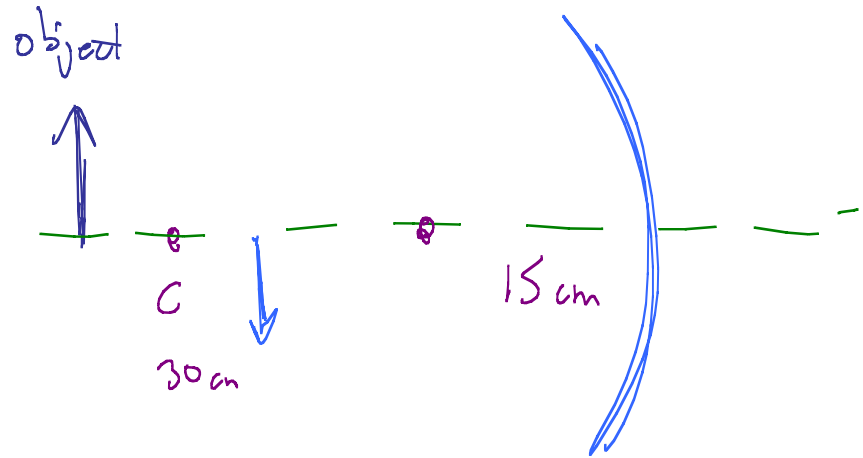
$$s = 36 \text{ cm}$$

$$f = 15 \text{ cm}$$

$$\frac{1}{s} + \frac{1}{s'} = \frac{1}{f}$$

$$s' = 25.7 \text{ cm}$$

$$m = \frac{h'}{h} = -\frac{s'}{s} = -0.714 \quad s' = 25.7 \text{ cm}$$



Inverted
smaller

m = magnification

h = height
obj

h' = height
image

31.19 An object is five focal lengths from concave mirror a) How do object & image heights compare b) Is image upright or inverted.

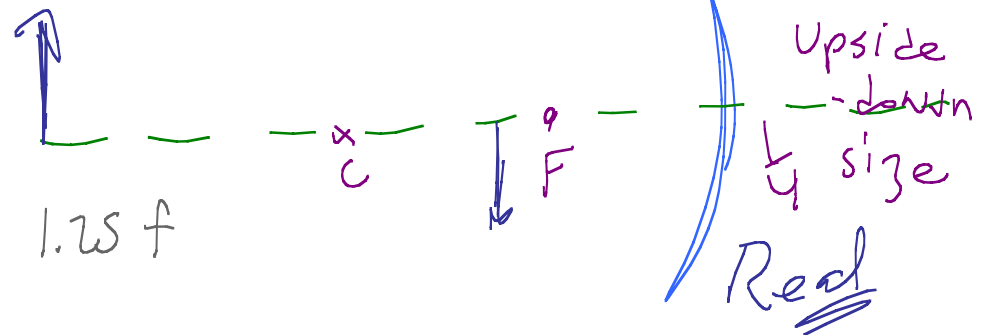
$$m = \frac{h'}{h} = -\frac{s'}{s}$$

f $s = 5f$

$$\frac{1}{s} + \frac{1}{s'} = \frac{1}{f}$$

$$s' = \frac{5f}{4}$$

$$= 1.25f$$



$$= -\frac{1}{4}$$

Lenses!

Curved surfaces

Thin lenses

