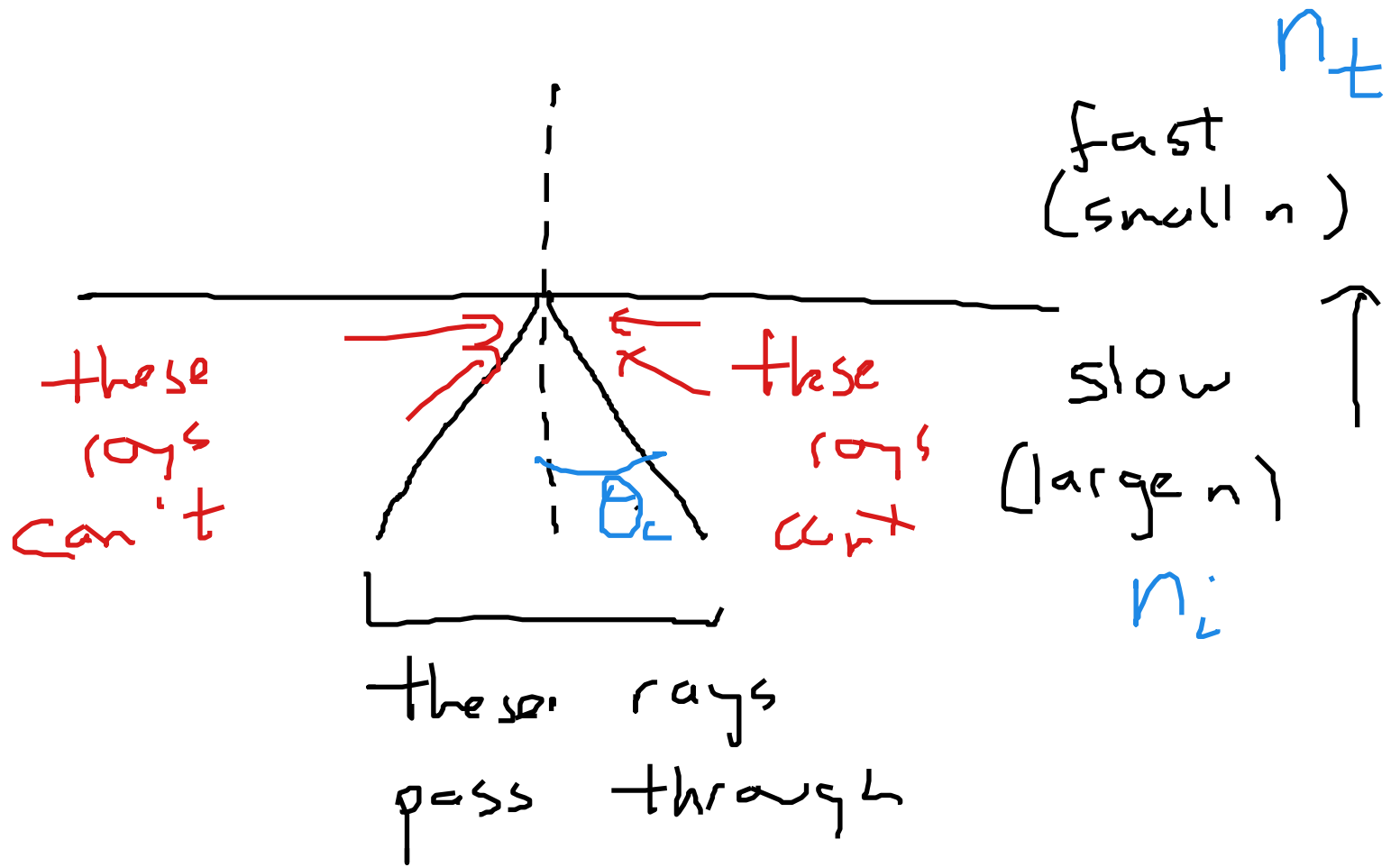


Total Internal Reflection



Critical Angle

$$\theta_c = \sin^{-1} \frac{n_t}{n_i}$$

2
For diamond $n = 2.4$

If light tries to go
from diamond n_1 into air n_2 .

What is θ_c ?

$$\theta_c = \sin^{-1} \left(\frac{1}{2.4} \right)$$

$$= 24.6^\circ$$

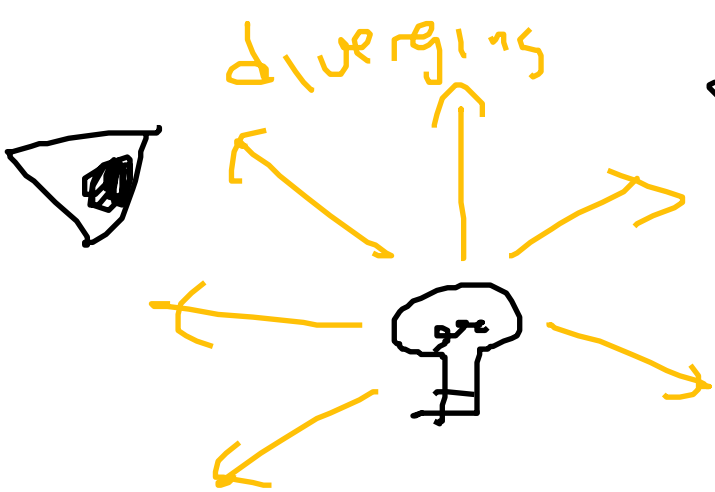


Ray hitting
surface
at a random
angle in diamond
has $> \frac{2}{3}$ chance of
staying inside

3

How We See

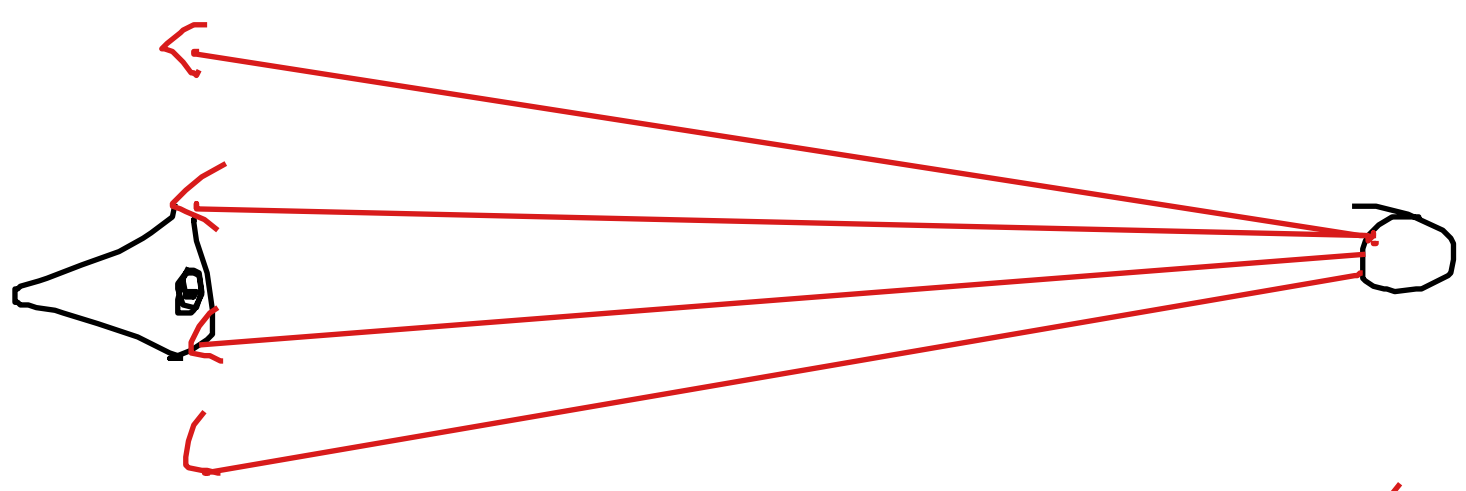
Objects give off diverging rays of light.



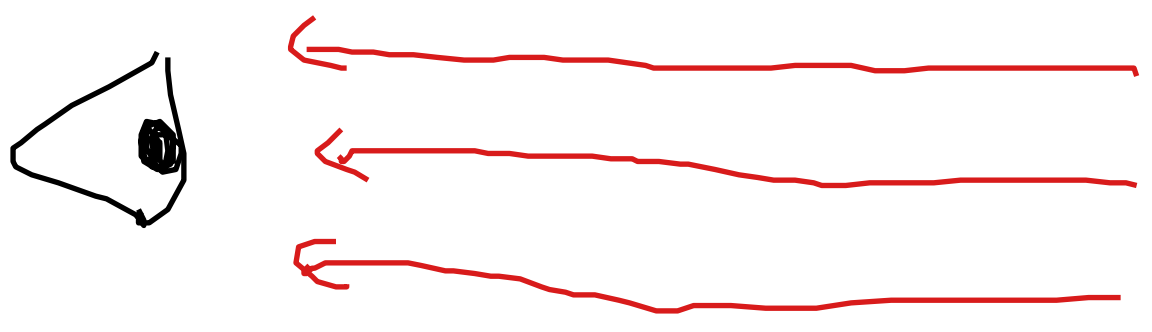
Our eyes see diverging rays, and trace them back to a point, and identify that as the location of the object.



Close object:
rays diverge
a lot



Far object: rays diverge
less (as seen
by the eye)



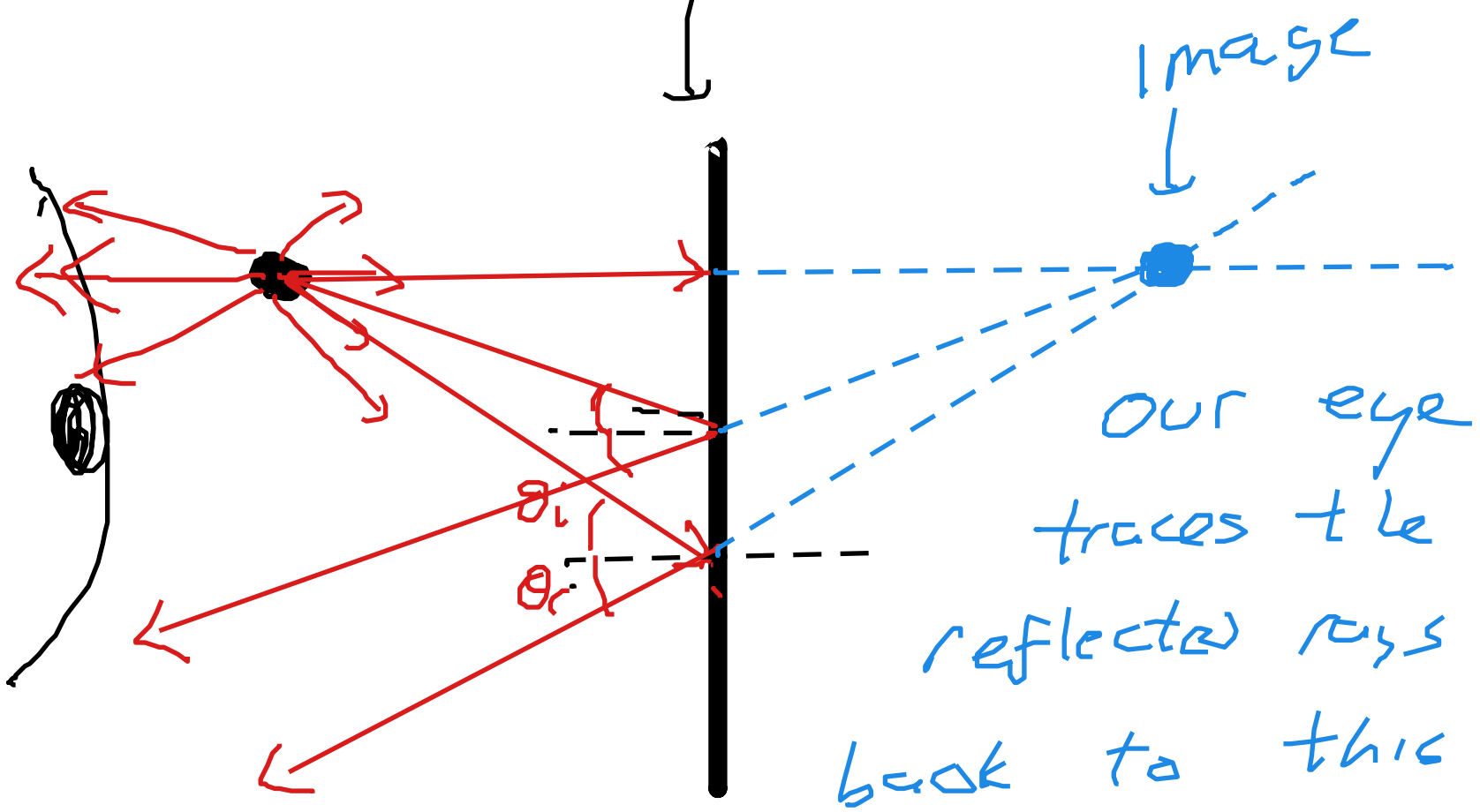
Very
distant
object

Images -

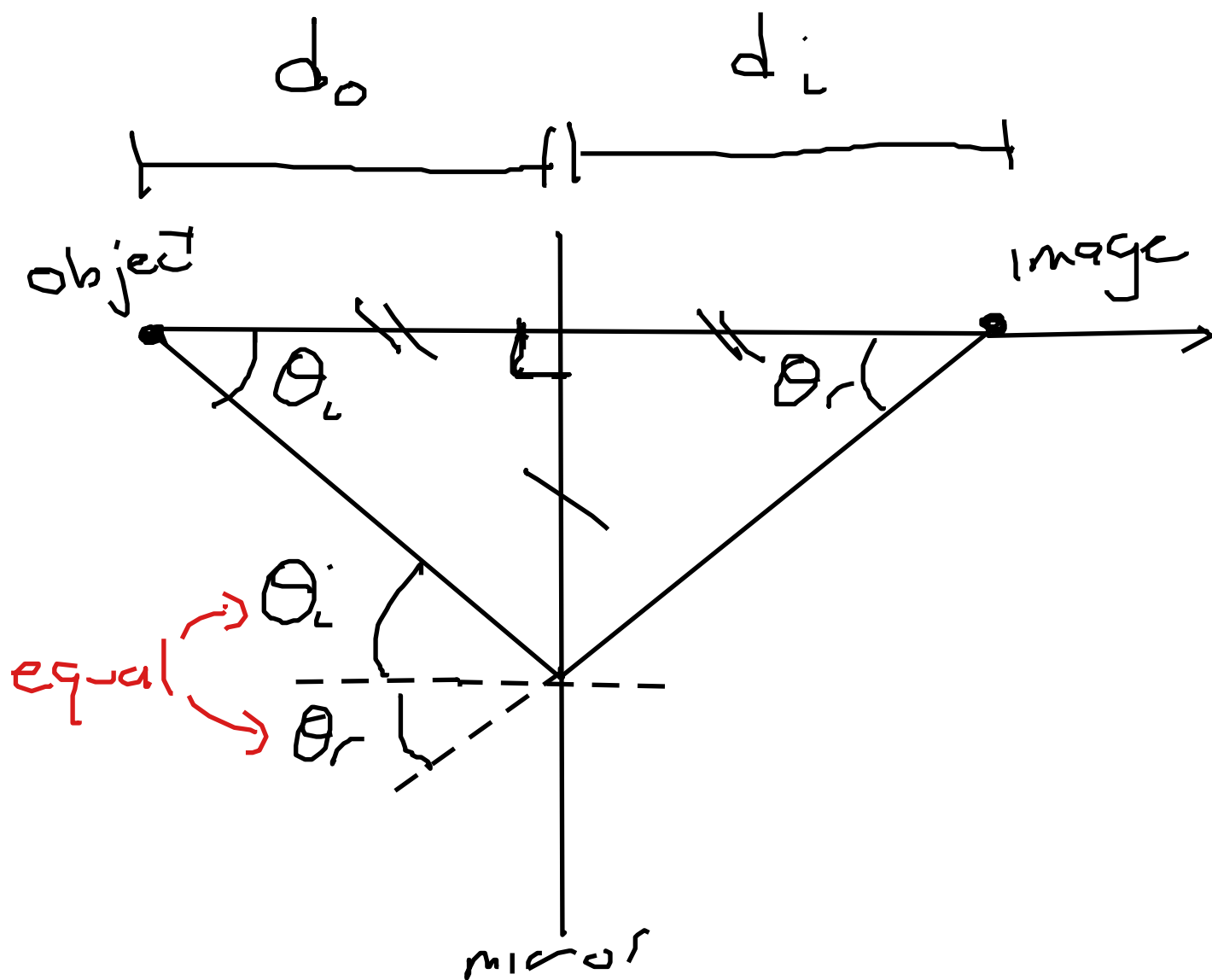
how our eyes are fooled

eg.

Flat or "plane" mirror



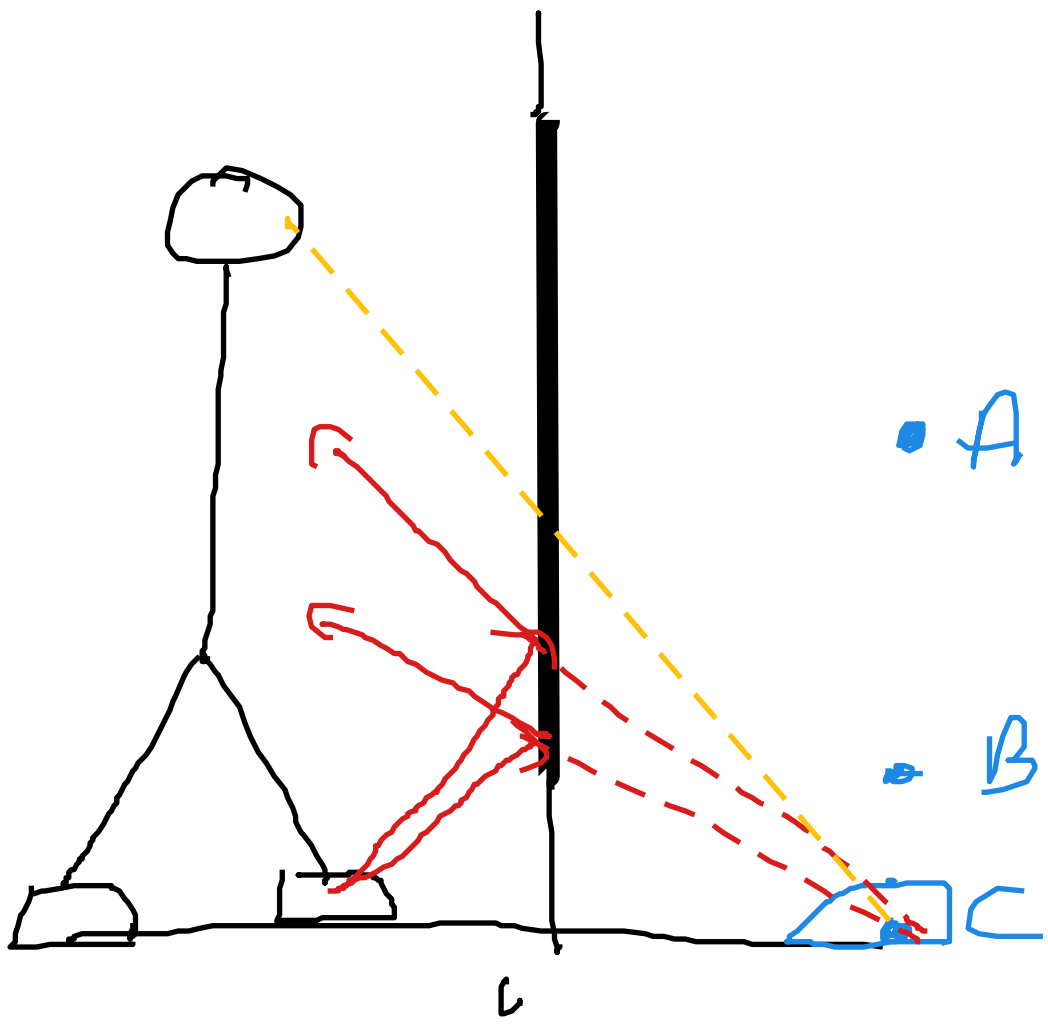
our eye traces the reflected rays back to this spot - sees an image



congruent triangles
(SAA)

$$\text{So } d_o = d_i$$

Image is just as far behind
the mirror as object is in front
of it

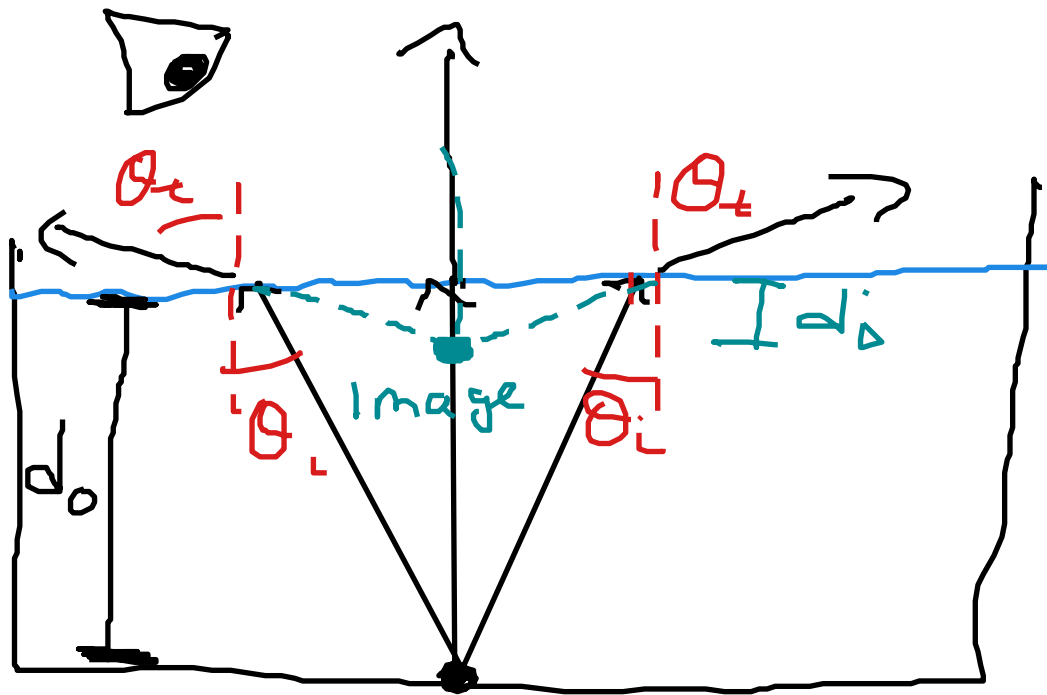


Where does this person see the image of their shoes? • D

E) can't see shoes

The image of shoe appears
directly across the plane
of the mirror, even if
mirror doesn't extend that
far

Object Underwater



Object

Object looks closer

to the surface than

it actually is

d_o : distance from object to "device"

d_i : distance from image to "device"