12-4-13 Lab MIRRORS

FIND f:

concave → real image

2 methods

in progress → i) image POST

TODAY → ii) conventional screen

measure actual m

$= \frac{h_i}{h_o}$ = RATIO OF ARROW HEIGHTS

convex / main method

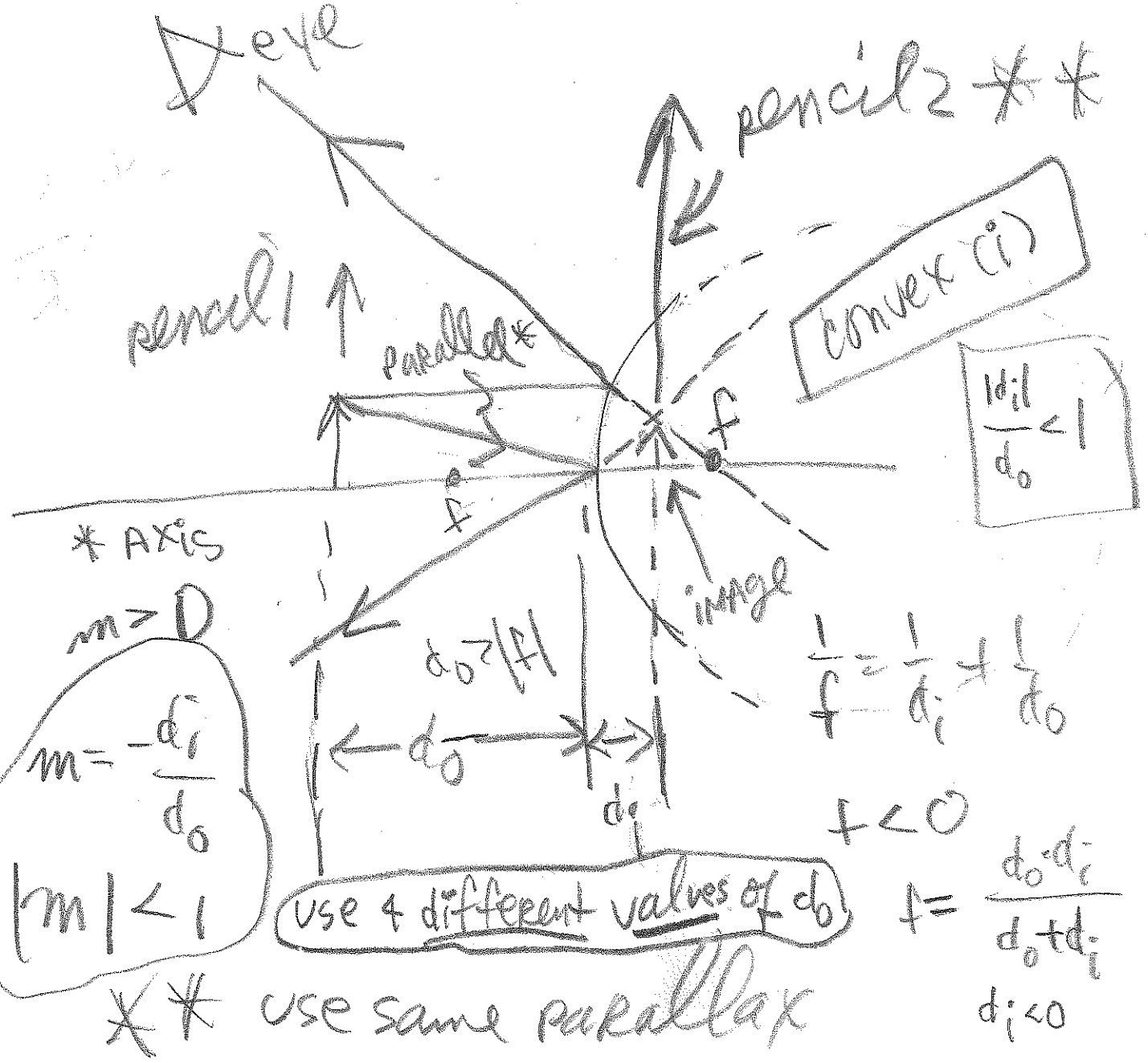
[virtual image] i) image POST

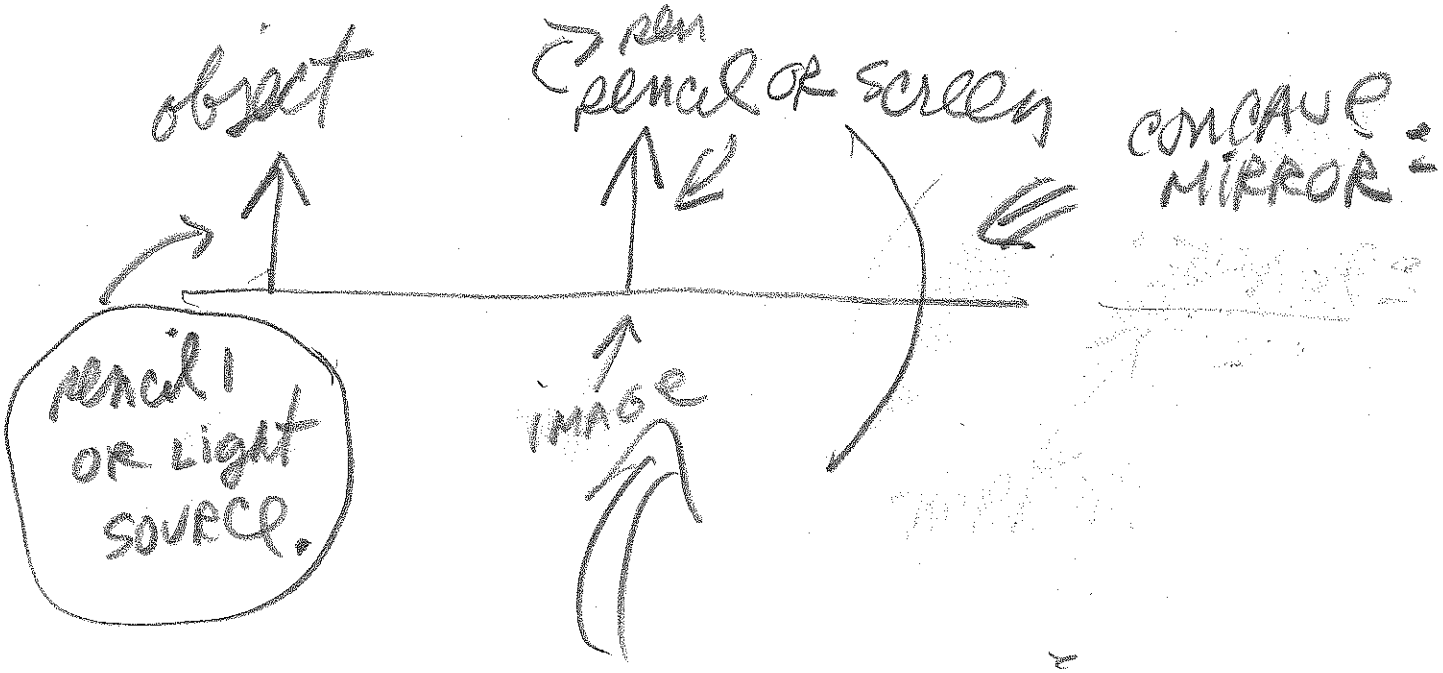
TODAY → 3 data sheets

(A) concave i) last time

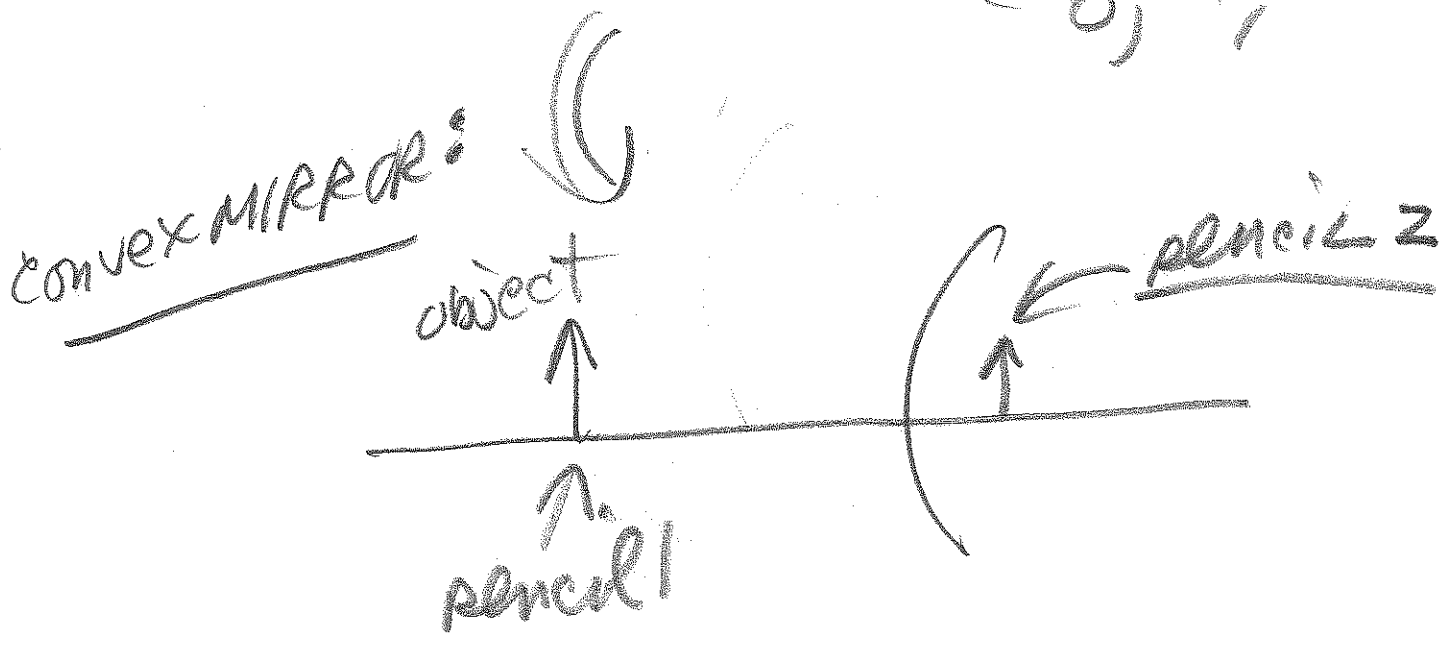
(B) concave ii) TODAY

(C) convex i) "


eye
pencil 2
pencil 1
convex (+)
parallel
f
f
* AXIS
image
$|d_i| < 1$
d_o
m > 0
$m = -\frac{d_i}{d_o}$
$|m| < 1$
use 4 different values of d_o
$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$
f < 0
$f = \frac{d_o d_i}{d_o + d_i}$
$d_i < 0$
** use same parallax
methods 12-2-13 notes
|m| < 1
m > 0
f
f
d_o
$d_i < 0$



DO NOT move MIRROR OR object when you measure d, d'



convex MIRROR

Included with

convex mirror data

(i) a theoretical

way to find the

true value of f.

Explain the experiment.

note: I mentioned

image post method

with long track

(large d_i)

(ii) measure $f = \dfrac{d_o \cdot d_i}{d_o + d_i}$

for 4 different <u>pairs</u>

of d_i and d_o ⇒ check if f

is reproducible

Photocopy – file

Data Sheet CONVEX Mirror: DETERMINATION OF f (CONVEX MIRROR.)

do	d_{obest} Δd_{oinst} 0.05 cm ← not used $(d_{omax} - d_{omin})/4$ Δd_o (larger of previous two.)	} move pencil 1 3 times
di	d_{ibest} $\Delta d_{i\ inst}$ = 0.05 cm ← not used $(d_{imax} - d_{imin})/4$ Δd_i (larger of previous two.)	} 4 locations for pencil 2
	$d_{obest} * d_{ibest}/(d_{obest} + d_{ibest})$ =	
f_{best}	measure	

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

4 different times with 4 pairs of d_o.

calculate SDM = $\frac{S.D.}{\sqrt{4}}$

convex

Compare f_{best} and f_{acc} with the overall error, which gives the range, as discussed in class. Does the accepted value of f fall within the range centered at the best value? Hint: Check if $f_{min} < f_{acc} < f_{max}$, where f_{min} is the minimum possible using the values of the uncertainty and plugging into the formula by *subtracting the uncertainty* in the numerator and *adding the uncertainty* in the denominator; similar reverse logic should be used to get f_{max}: add in the numerator and subtract in the denominator.

Percent error for f

SDM = S.D./√4

Theoretical magnification m =

ACTUAL MAGNIFICATION m =

Percent error for magnification m

Show work for these calculations here: