

HW 5

1a & b)

$$n = \frac{c}{v}$$

\uparrow index of refraction (no units)

\leftarrow speed in material m/s

3×10^8 m/s

1a)

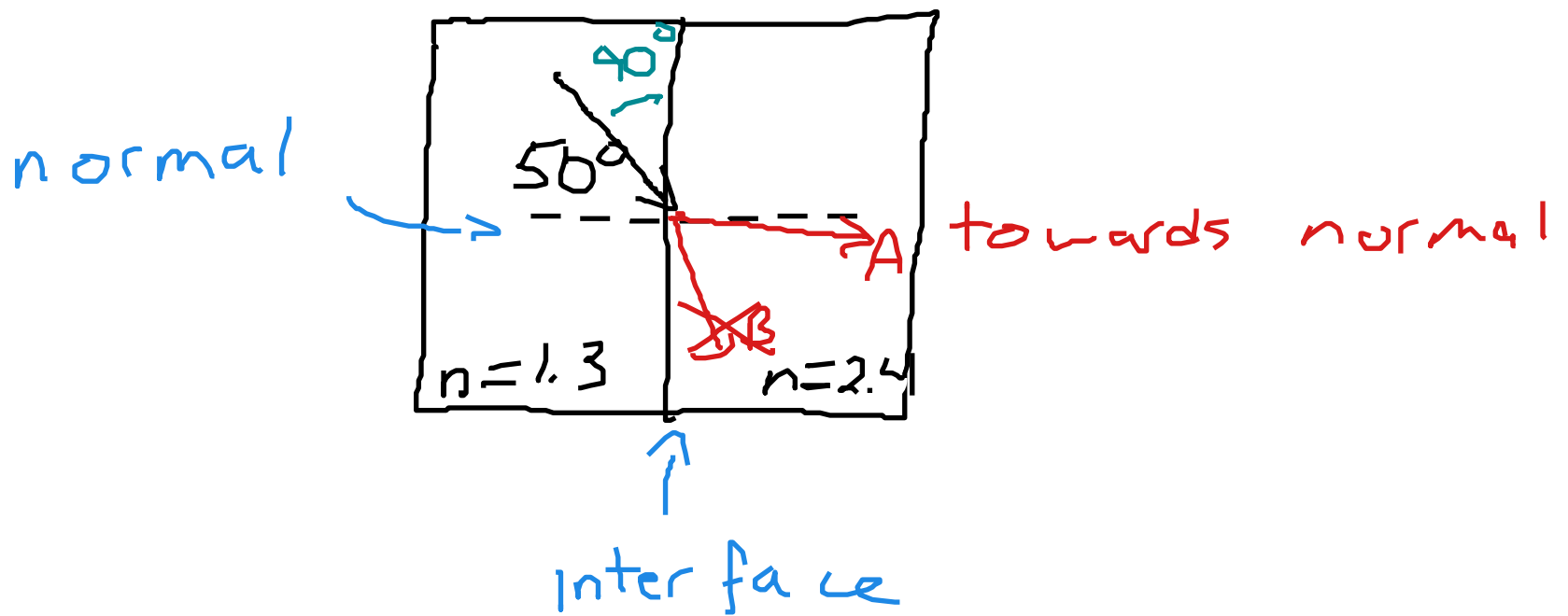
$$v = \frac{\lambda}{T}$$

don't use this equation

\leftarrow period of wave, not given (s)

2) Snell's Law

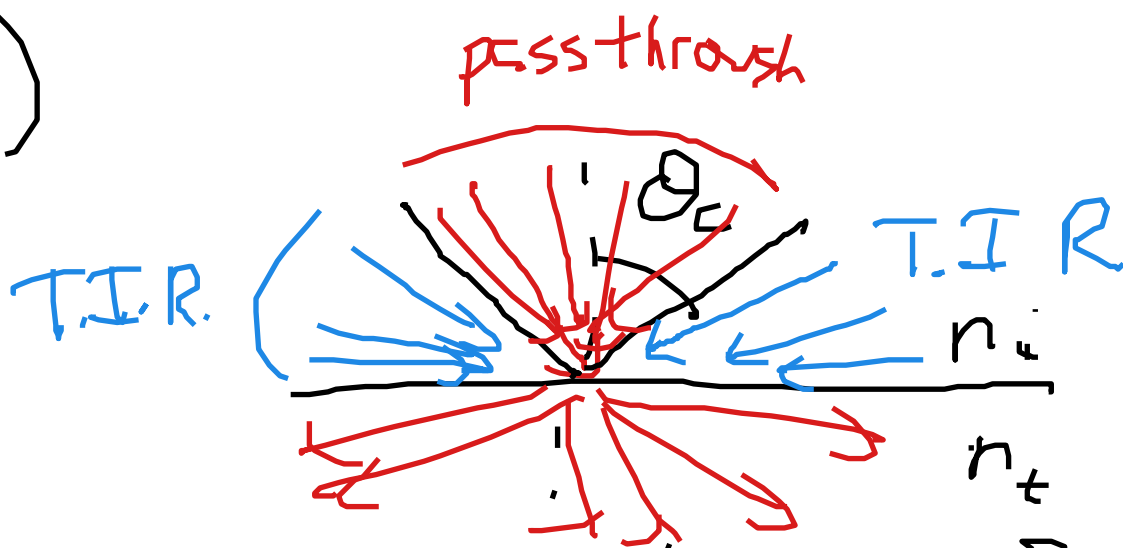
$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$



$$1.3 \sin 50^\circ = 2.4 \sin \theta_2$$

3) When light speeds up
 (index becomes smaller)
 bends away from normal
 (θ gets bigger)

4)

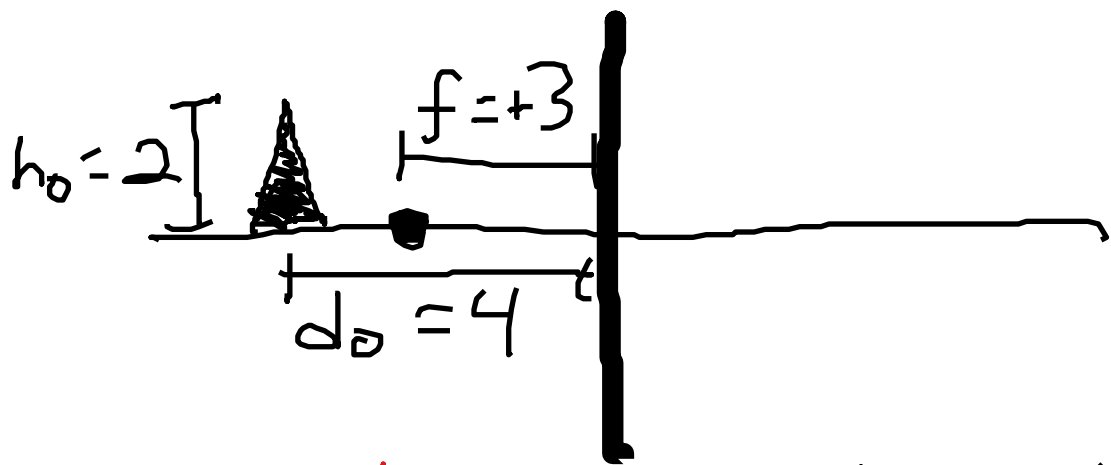


Will it pass through?

$n_t > n_i$: yes

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

converging
mirror



converging
 $f = +3$

always
 $d_o = +4$

real
 $d_i = +12$

$m = -3$

always
 $h_o = +2$

$h_i = -6$

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

$$\frac{1}{3} = \frac{1}{4} + \frac{1}{d_i}$$

$$\frac{1}{3} - \frac{1}{4} = \frac{1}{d_i}$$

$$\frac{1}{12} = \frac{1}{d_i}$$

$$d_i = +12$$

$$d_i = \frac{d_o f}{d_o - f}$$

$$= \frac{4(3)}{4-3} = 12$$

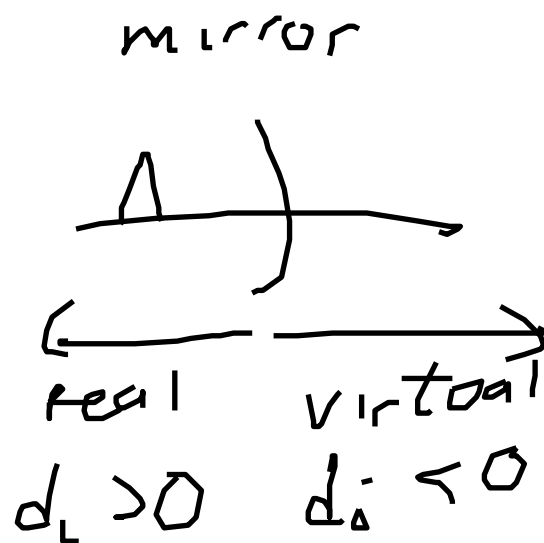
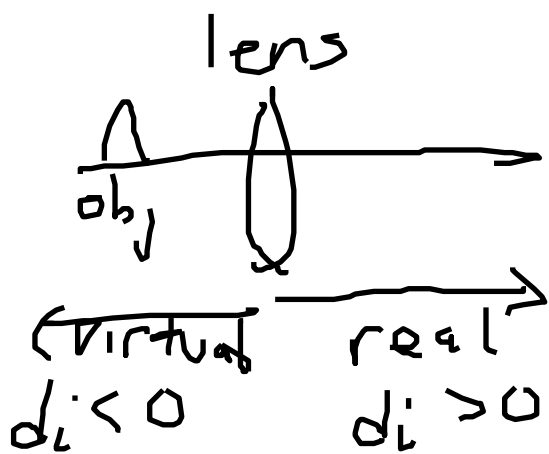
- $m = \frac{h_i}{h_o}$

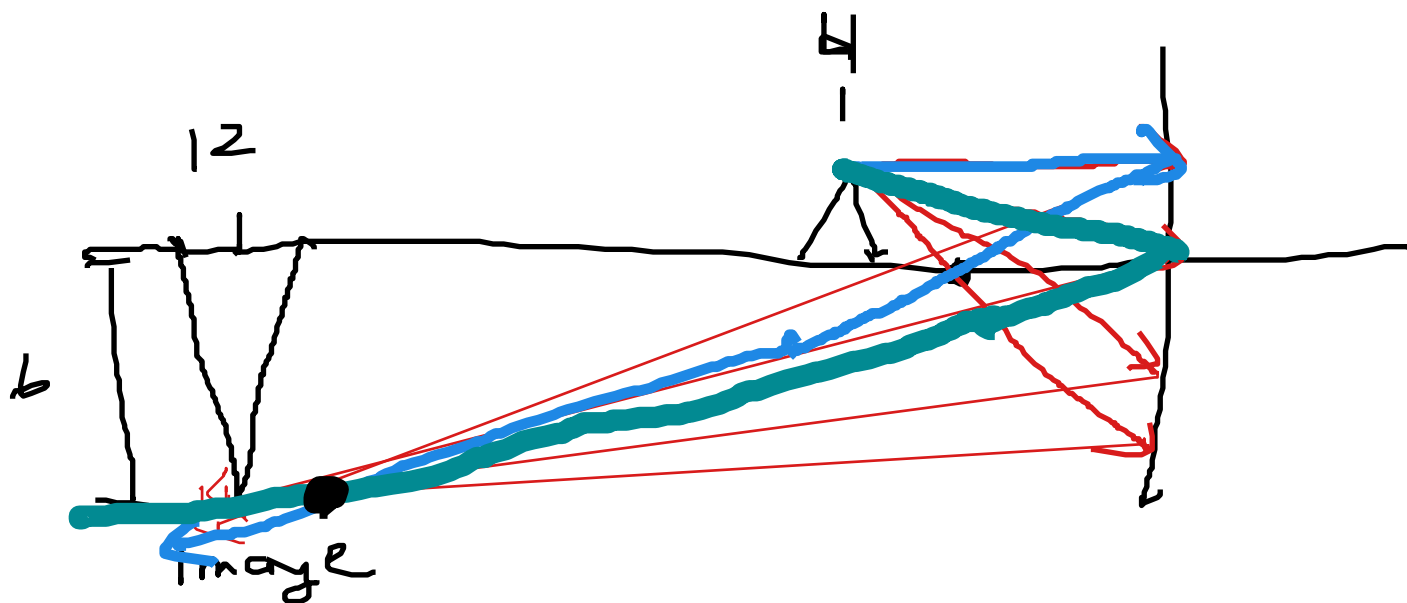
- $m = -\frac{d_i}{d_o}$

$$m = -\frac{12}{4} = -3$$

$$h_i = M h_o$$

$$h_i = (-3)(2) = -6$$





ray parallel to axis
 passes through focal point
 (converging) or appears
 to come from focal pt
 (diverges)

ray hits center of lens isn't bent
 ray hits center of mirror is
 reflected with same angle
 (with respect to the axis)