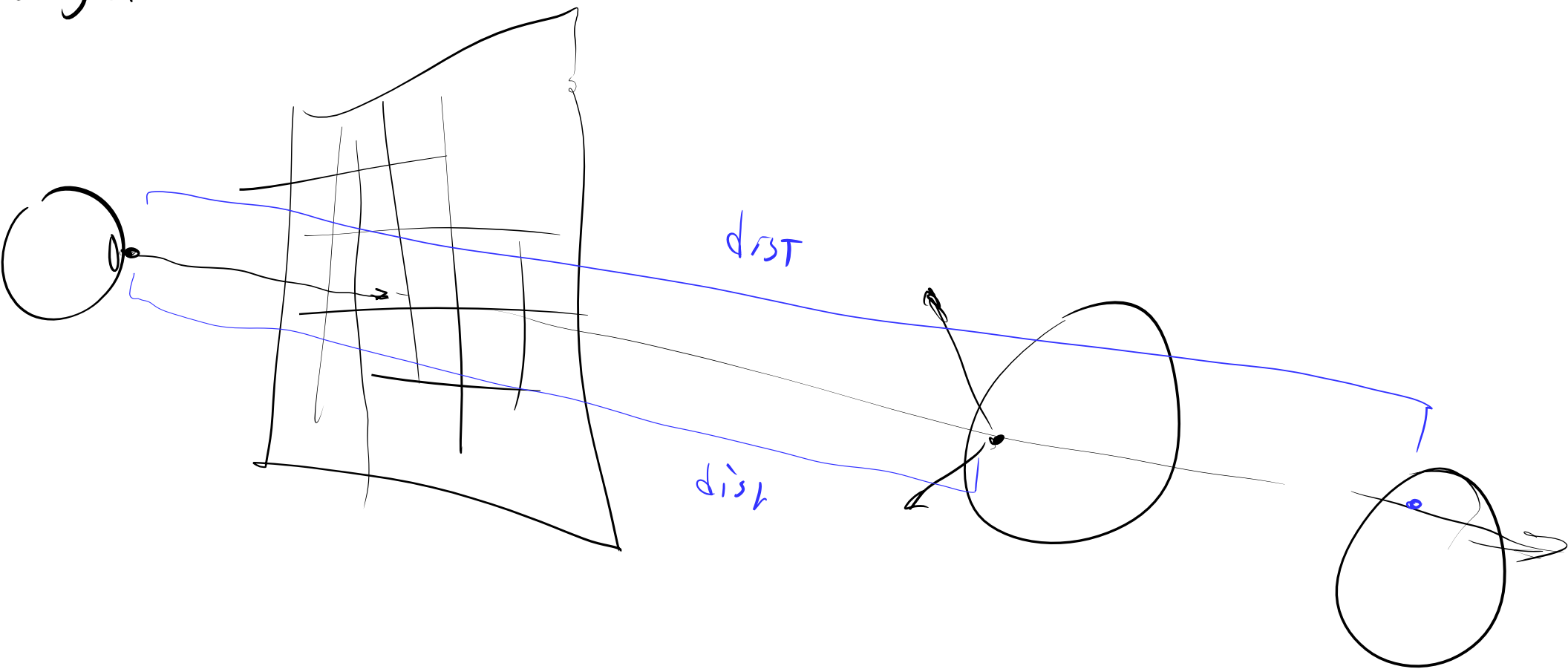
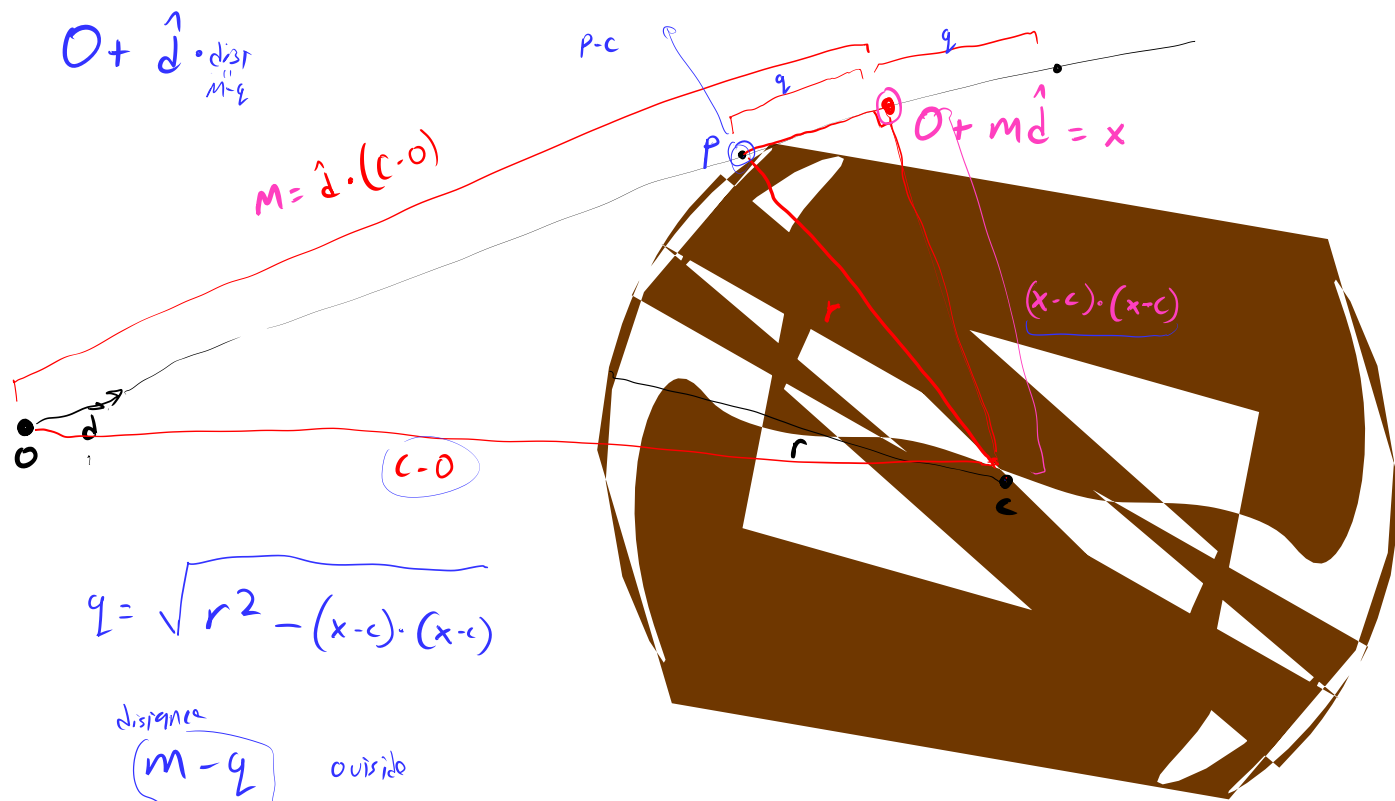




direction
↑
origin





$$O + \hat{d} \cdot \text{dist} \\ m - q$$

$$M = \hat{d} \cdot (c - o)$$

$$O + m\hat{d} = x$$

$$(x - c) \cdot (x - c)$$

$$c - o$$

$$q = \sqrt{r^2 - (x - c) \cdot (x - c)}$$

distance

$$m - q$$

outside

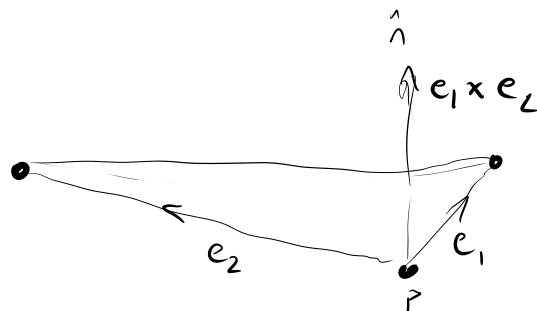
$$m + q$$

inside

Ray - Triangle Intersection

1. ray - plane

2. check inside triangle?



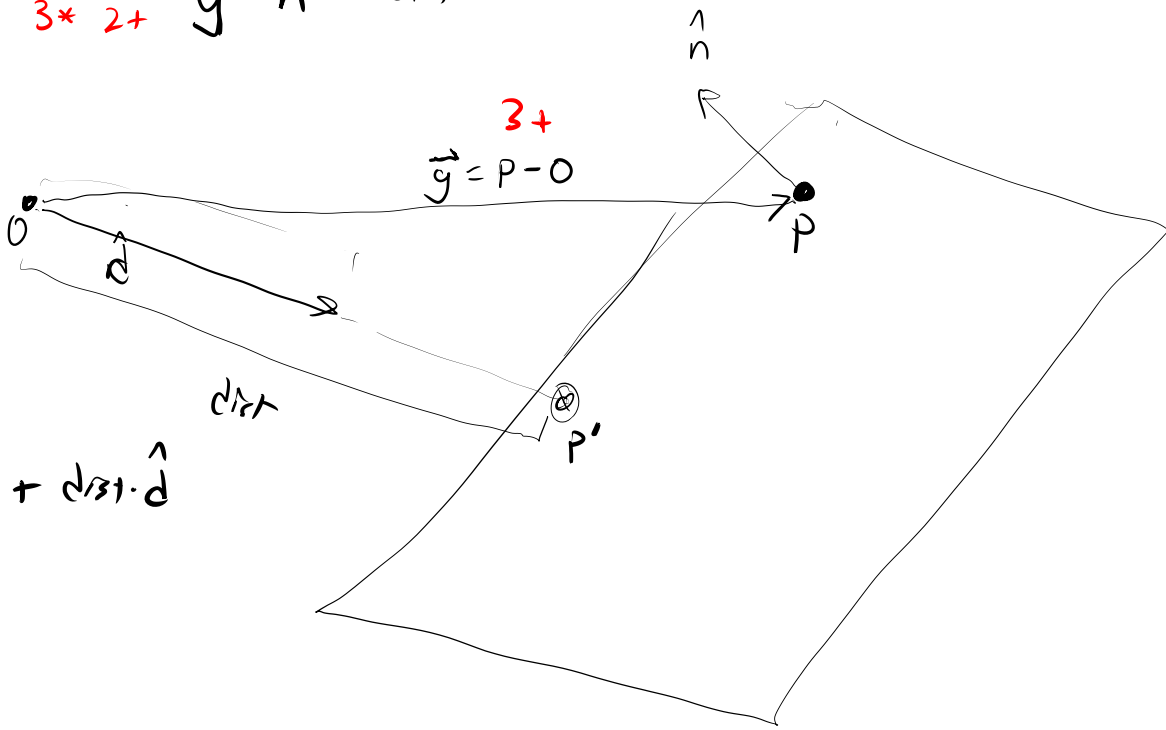
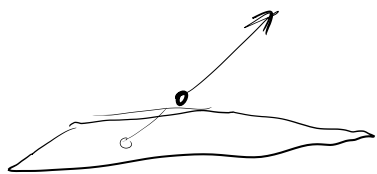
*	6
+	7
:	1

* p1, n1, e1
* AA form
* #obj

$$3 \times 2 + \hat{d} \cdot \hat{n} = \text{dist} / \text{unit } \hat{d}$$

$$3 \times 2 + \vec{g} \cdot \hat{n} = \text{dist or } u - pt$$

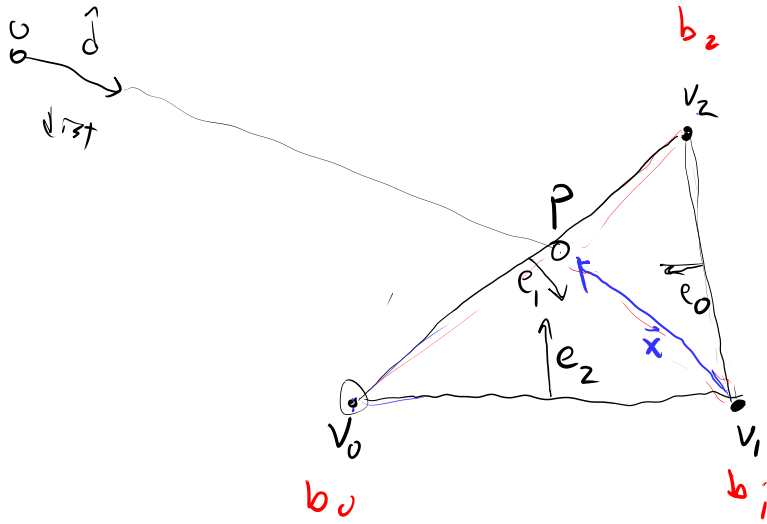
$$\text{dist} = \frac{\vec{g} \cdot \hat{n}}{\hat{d} \cdot \hat{n}} \quad | \text{div}$$



$$P' = O + \text{dist} \cdot \hat{d}$$

18*
22+
1 ÷

$$P = \underset{3+}{O} + \underset{3*}{d_1} \hat{d} + \underset{3+}{d_2} \hat{d}$$



Where

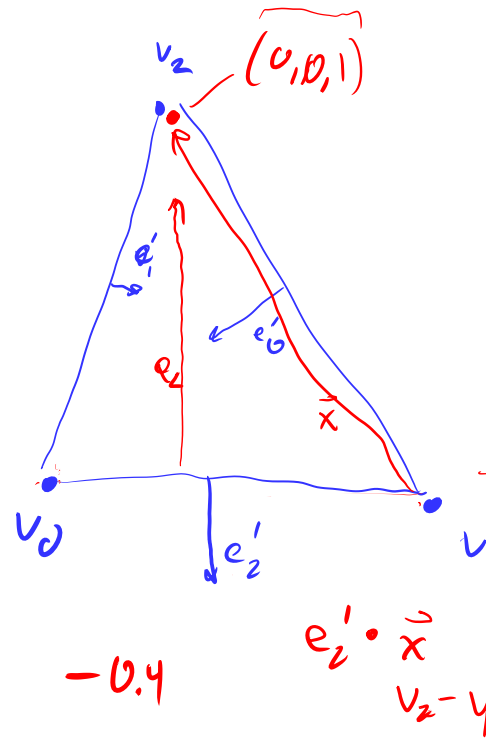
Barycentric coordinates

$$b_0 + b_1 + b_2 = 1$$

$$v_0 b_0 + v_1 b_1 + v_2 b_2 = P$$

$$\text{inside if } 0 \leq b_i \leq 1$$

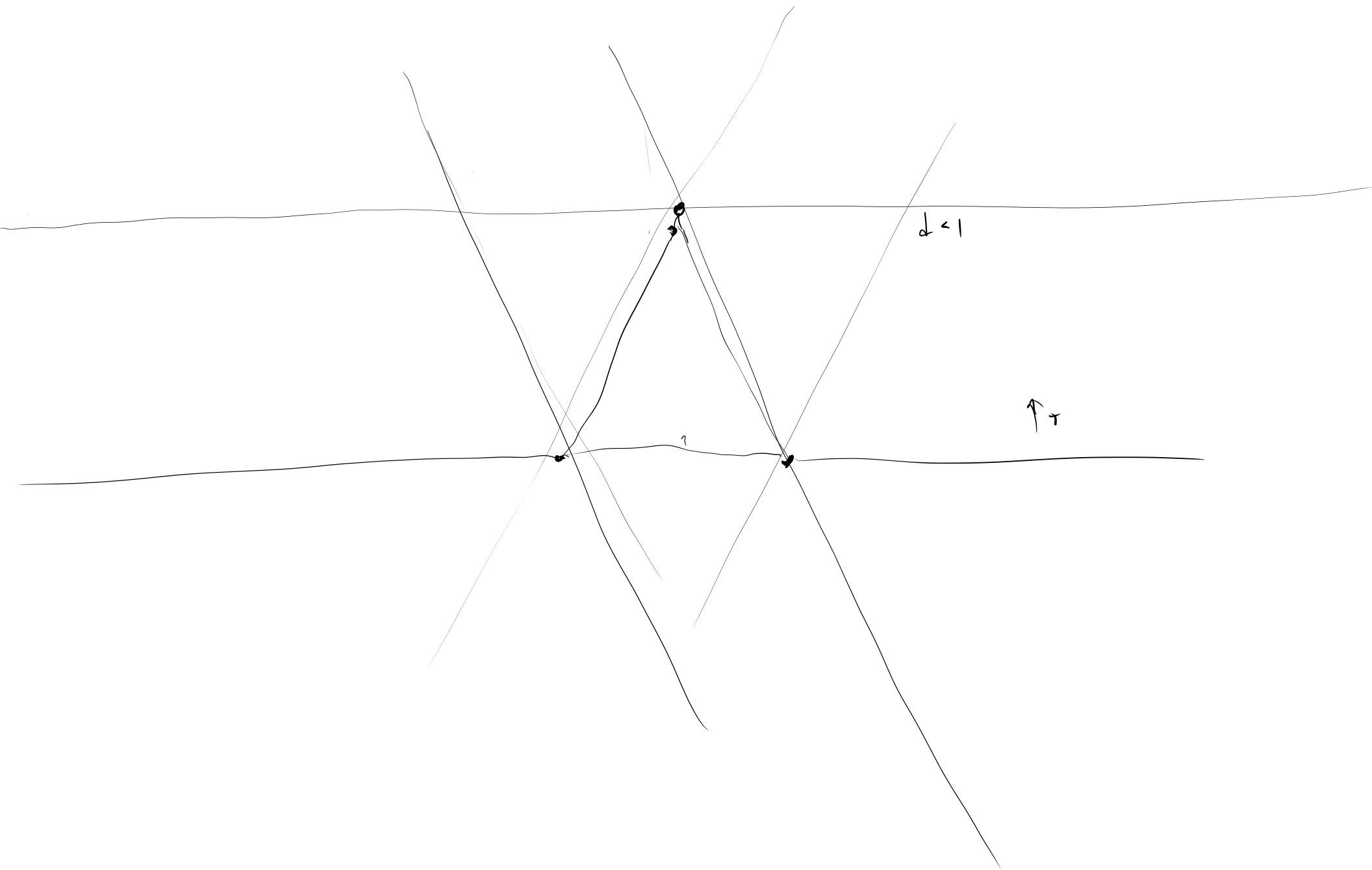
(b_0, b_1, b_2)



$$\begin{aligned} \vec{e}'_0 &= \hat{n} \times (v_2 - v_1) \\ \vec{e}'_0 &= \vec{e}_0 \div (v_0 - v_1) \cdot \vec{e}_0 \\ b_0 &= \vec{x} \cdot \vec{e}_0 \end{aligned}$$

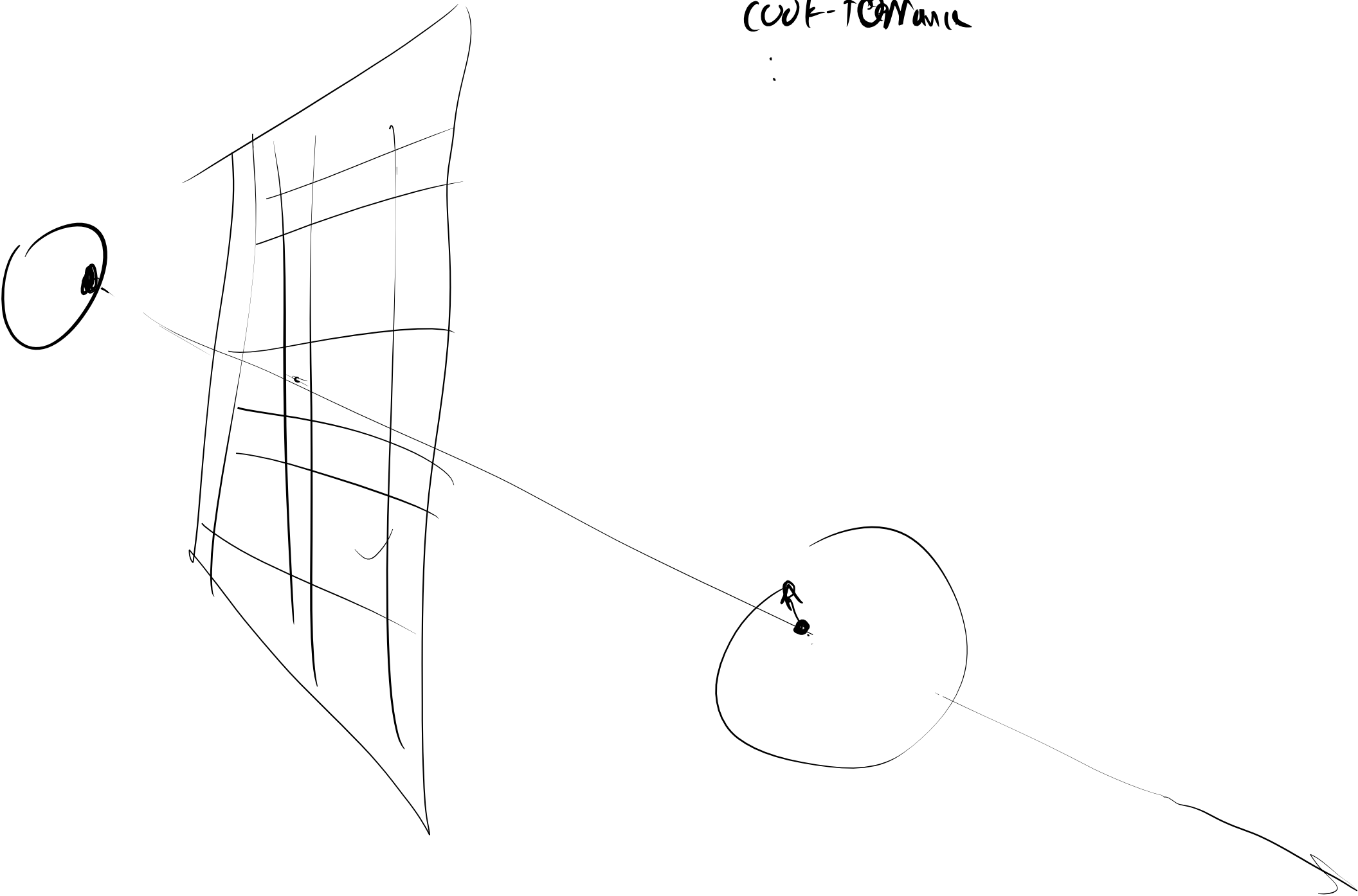
$$(v_0 - v_1) \cdot \vec{e}_0 = 1$$

-0.4 $e'_2 \cdot \vec{x} = v_2 - v_1$



phen
cook-~~to~~ance

:



Shadow



for x
for y

create ray

for object
intersect

nearest:

for each light

create shadow ray

for obj

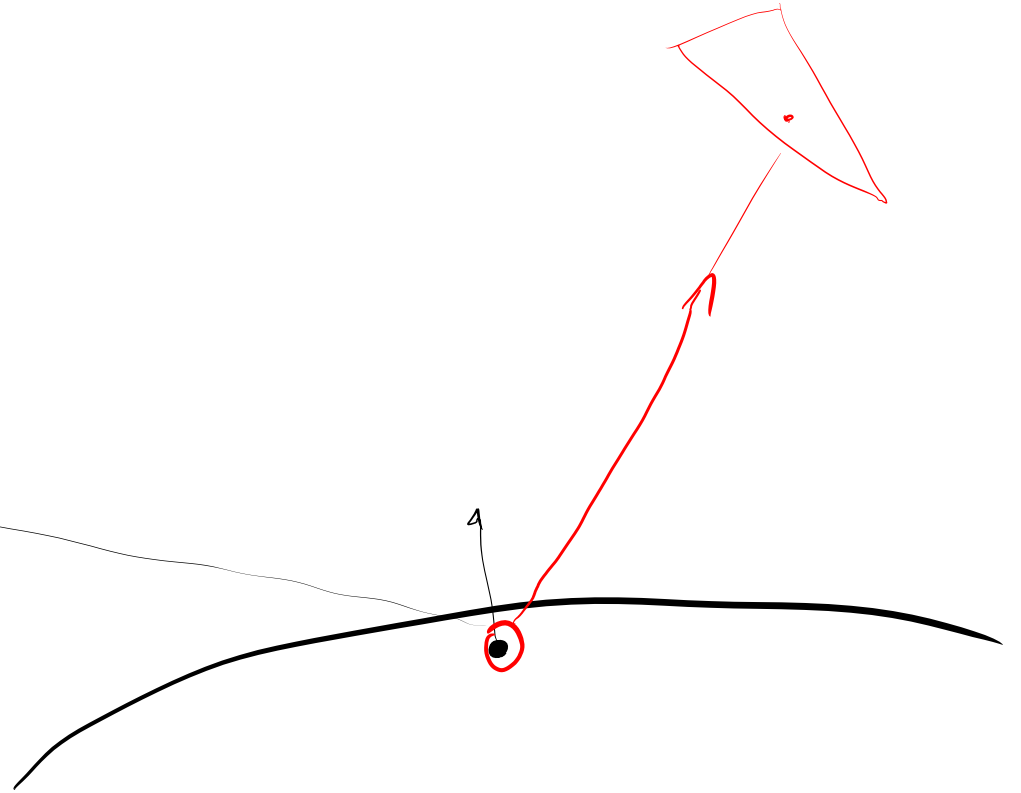
intersect

if nearer than light

ignore light

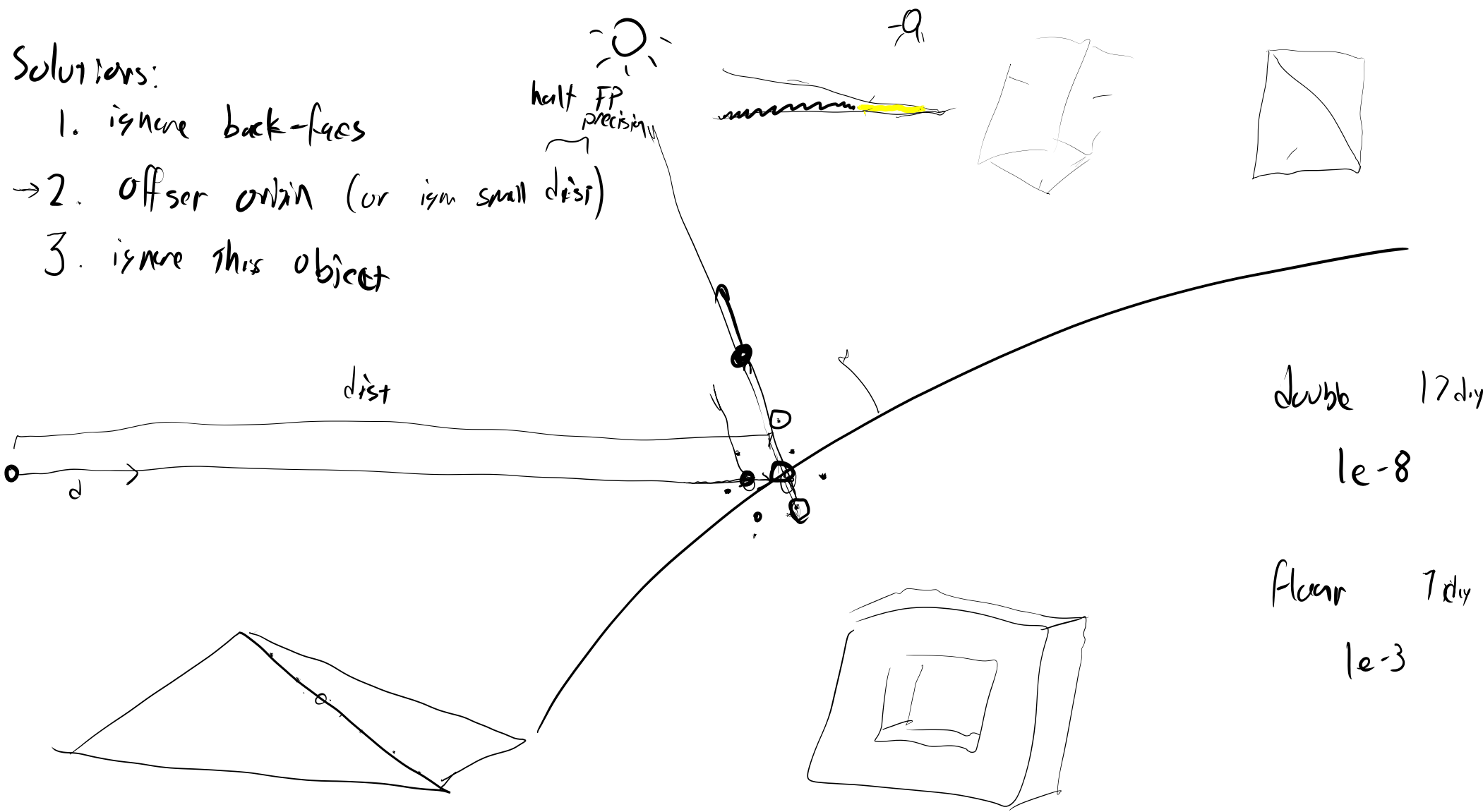
else

add illum



Solutions:

- 1. ignore back-faces
- 2. offset origin (or ignore small dist)
- 3. ignore this object

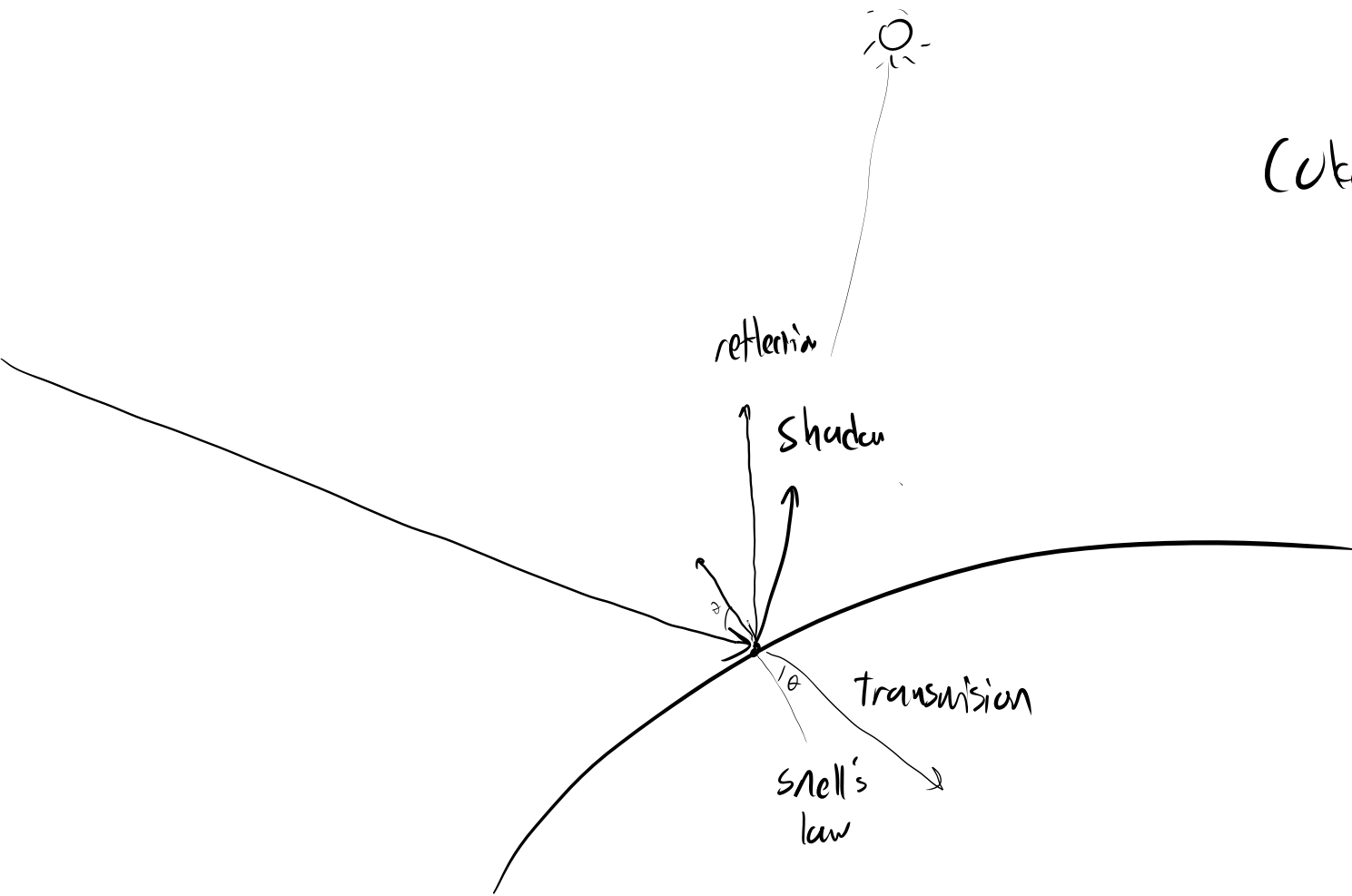


double 17 digits

1e-8

float 7 digits

1e-3



Color weighted away

- shininess (reflection)
- clearness (transmission)
- MATTE (ignoring)

