



Plane

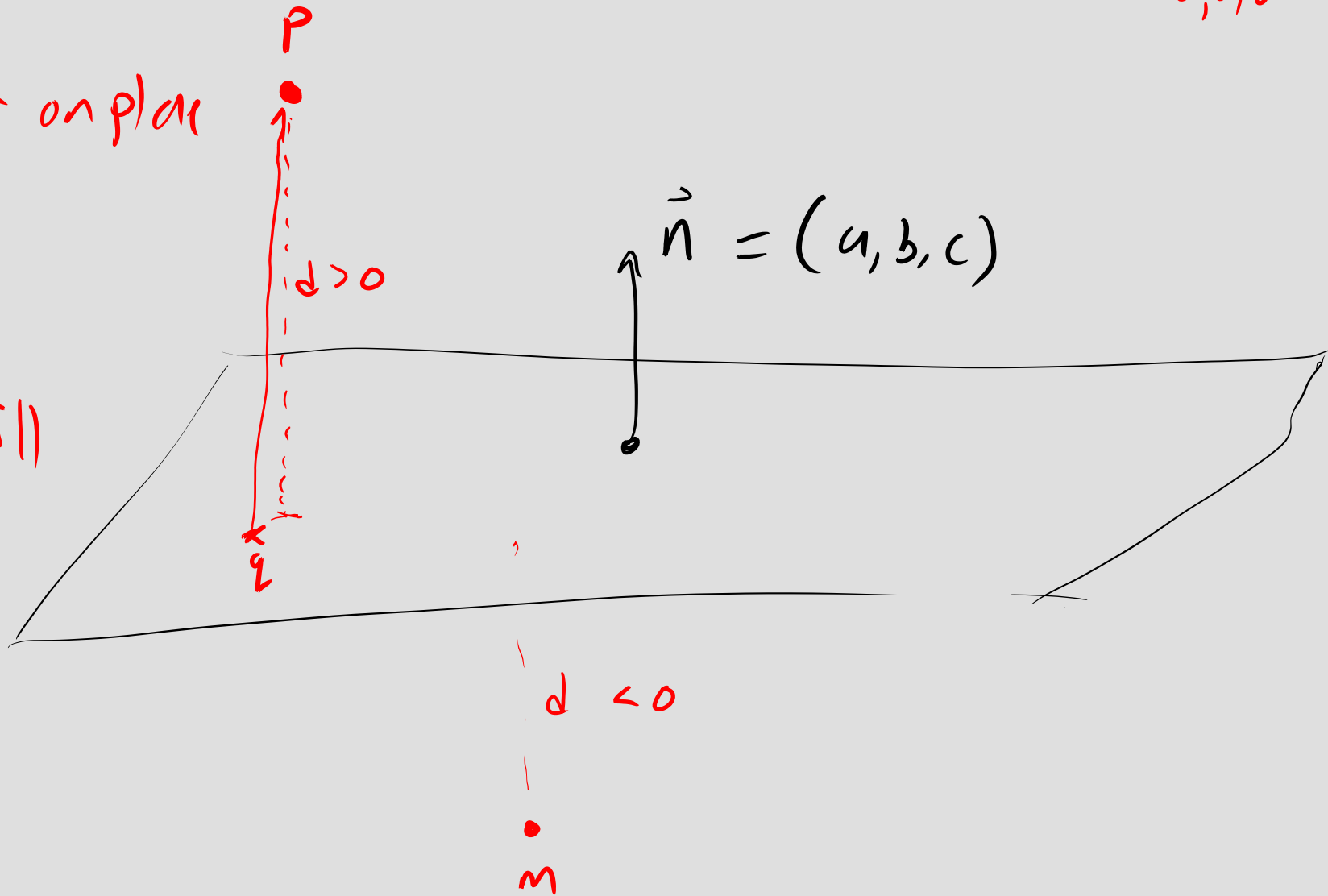
$$ax + by + cz + d = 0$$

*0,0,0

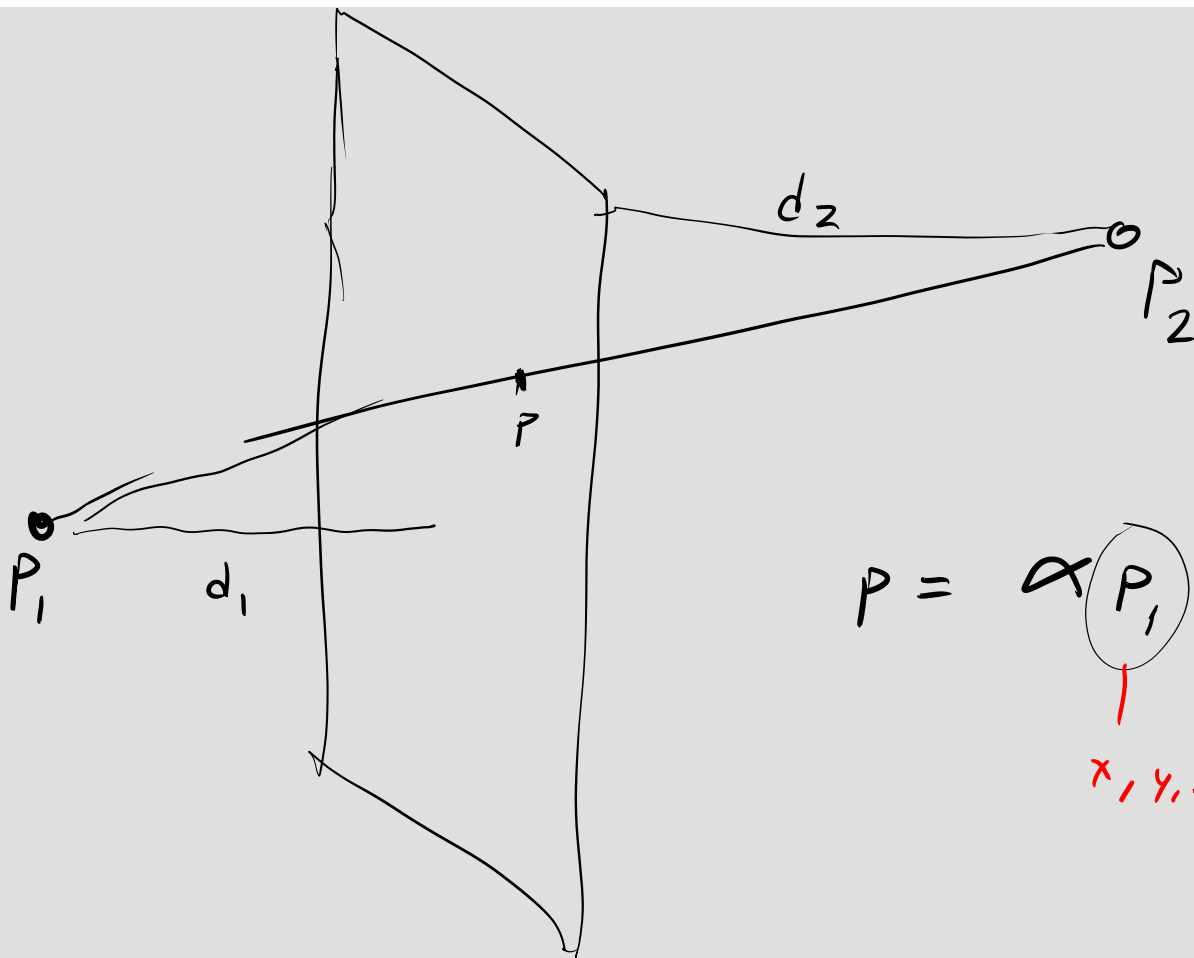
$q =$ any pt on plane

$$\vec{qP} \cdot \vec{n} = d$$

$$d = \text{dist} \parallel \vec{n} \parallel$$



$$\alpha = \frac{d_2^+}{d_2^+ - d_1^+}$$



$$P = \alpha P_1 + (1 - \alpha) P_2$$

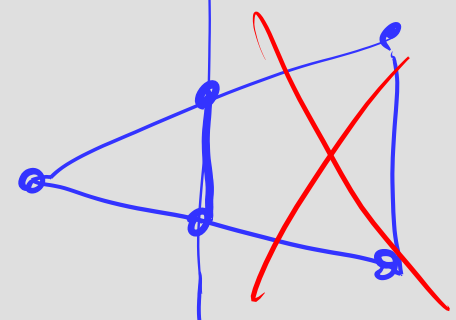
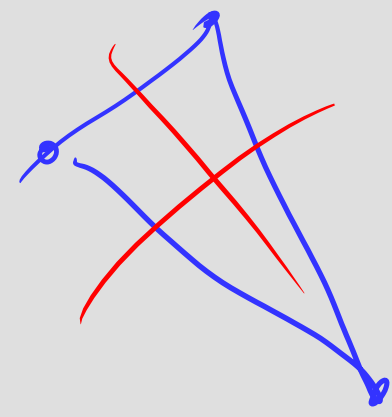
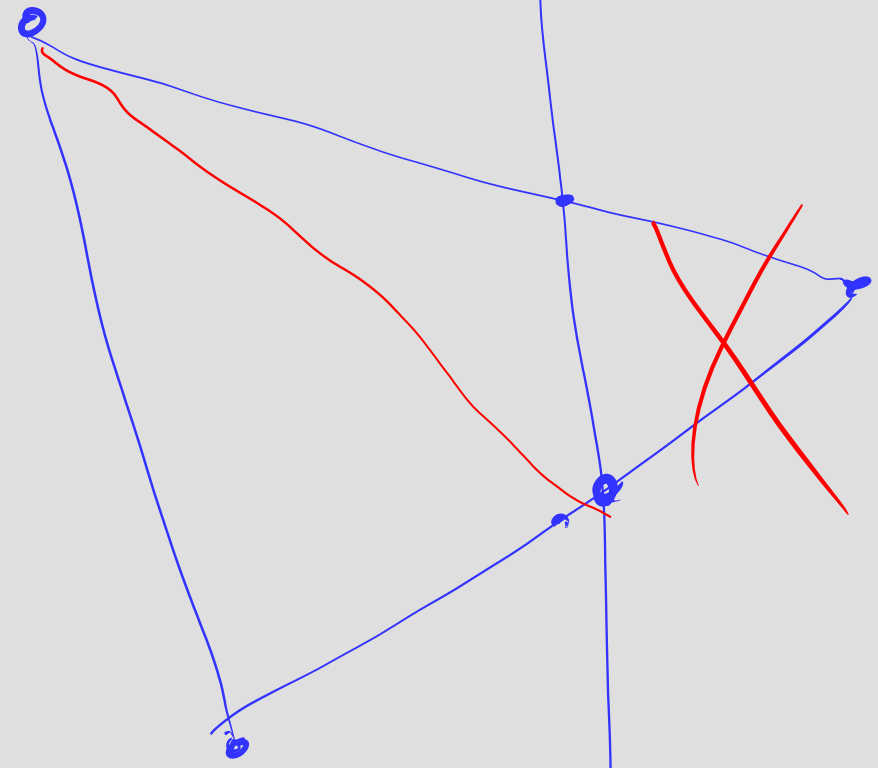
x, y, z, c, g, b, ...

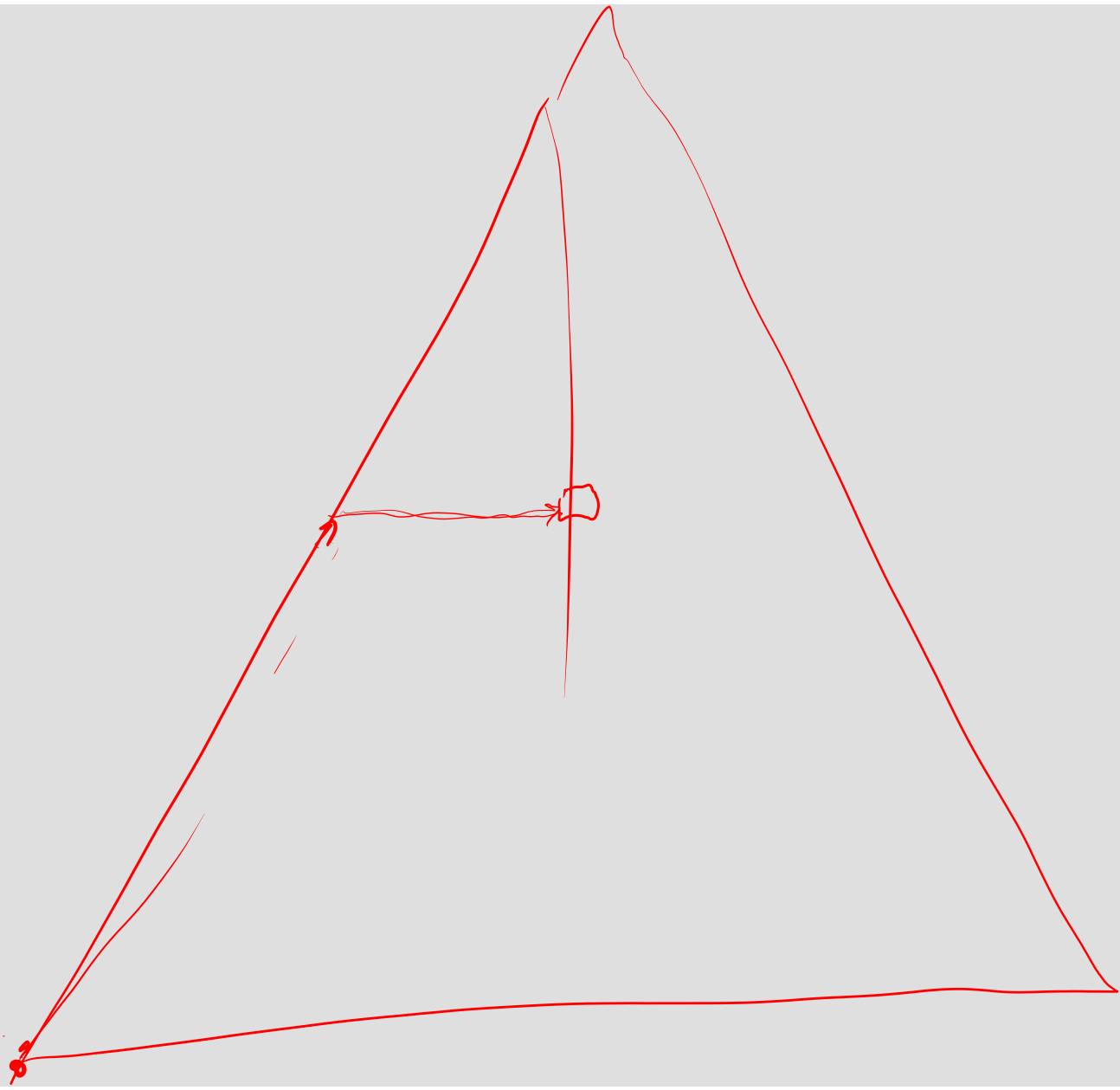
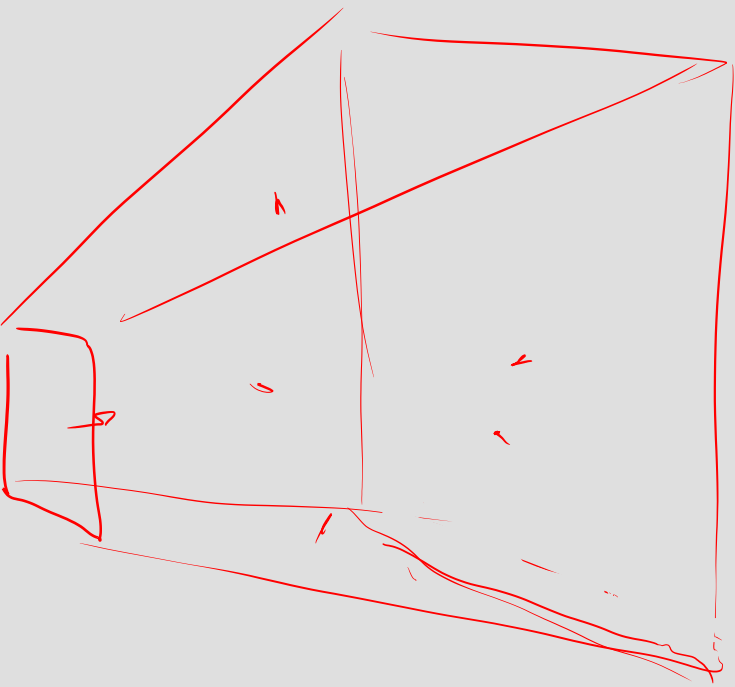
keep

→ discard

+

-





ray
origin
direction

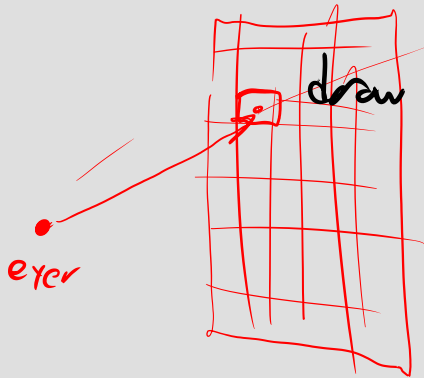
for each pixel
make ray

for each obj

find obj / ray intersect
remember closest

draw that color

t



embarrassingly parallel

Ray

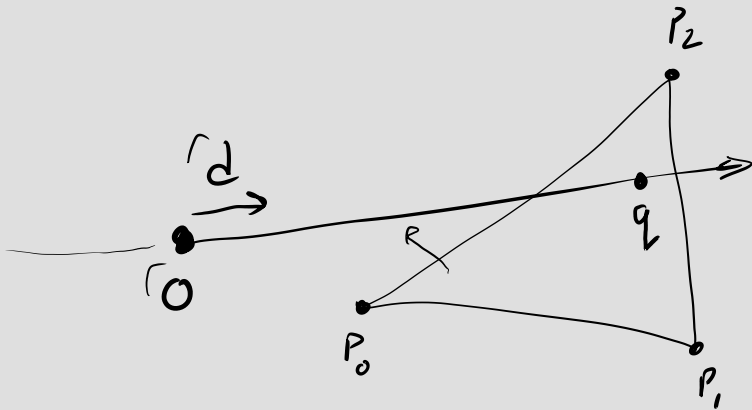
Origin - P_0

direction - vector

$t \leq 0$ behind us

1. ray-plane

2. check if in triangle



$$\vec{n} = \frac{(P_1 - P_0) \times (P_2 - P_0)}{\text{unit length}}$$

$$q = O + t \vec{d}$$

$$q_x n_x + q_y n_y + q_z n_z + M = 0$$

$q \cdot n$

$$\begin{aligned} M &= -P_0 \cdot \vec{n} \\ &= -P_1 \cdot \vec{n} \\ &= -P_2 \cdot \vec{n} \end{aligned}$$

Barycentric

Coordinates

$$\alpha = \frac{(p-B) \cdot \vec{e}_A}{c}$$

B
•

$$\alpha + \beta + \gamma = 1$$

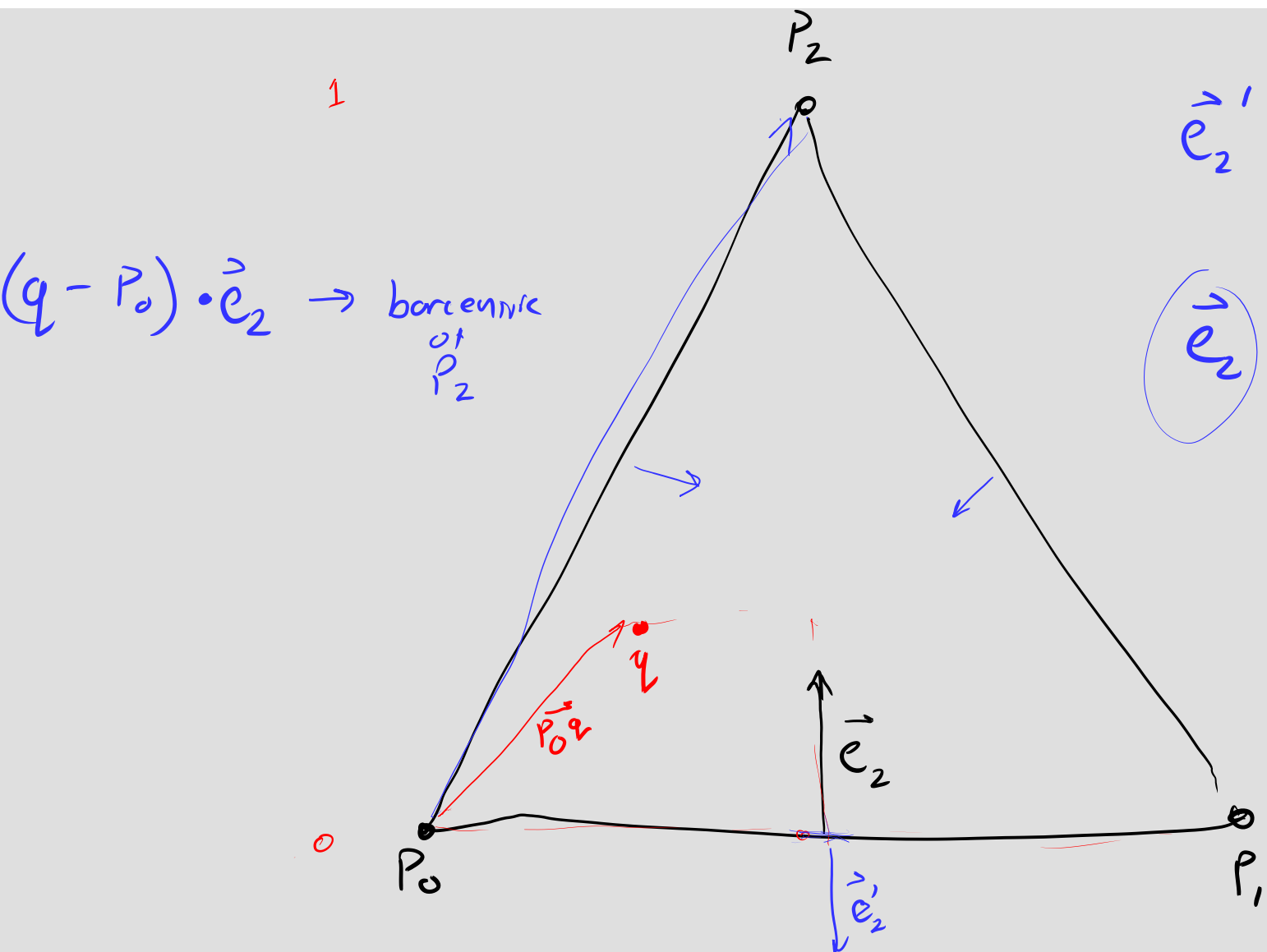
$$P = \alpha A + \beta B + \gamma C$$

A
•

C
•

P is inside Δ if

$$\begin{aligned} \alpha &\geq 0 \\ \beta &\geq 0 \\ \gamma &\geq 0 \end{aligned}$$



$$\vec{e}_2' = (P_1 - P_0) \times \vec{n}$$

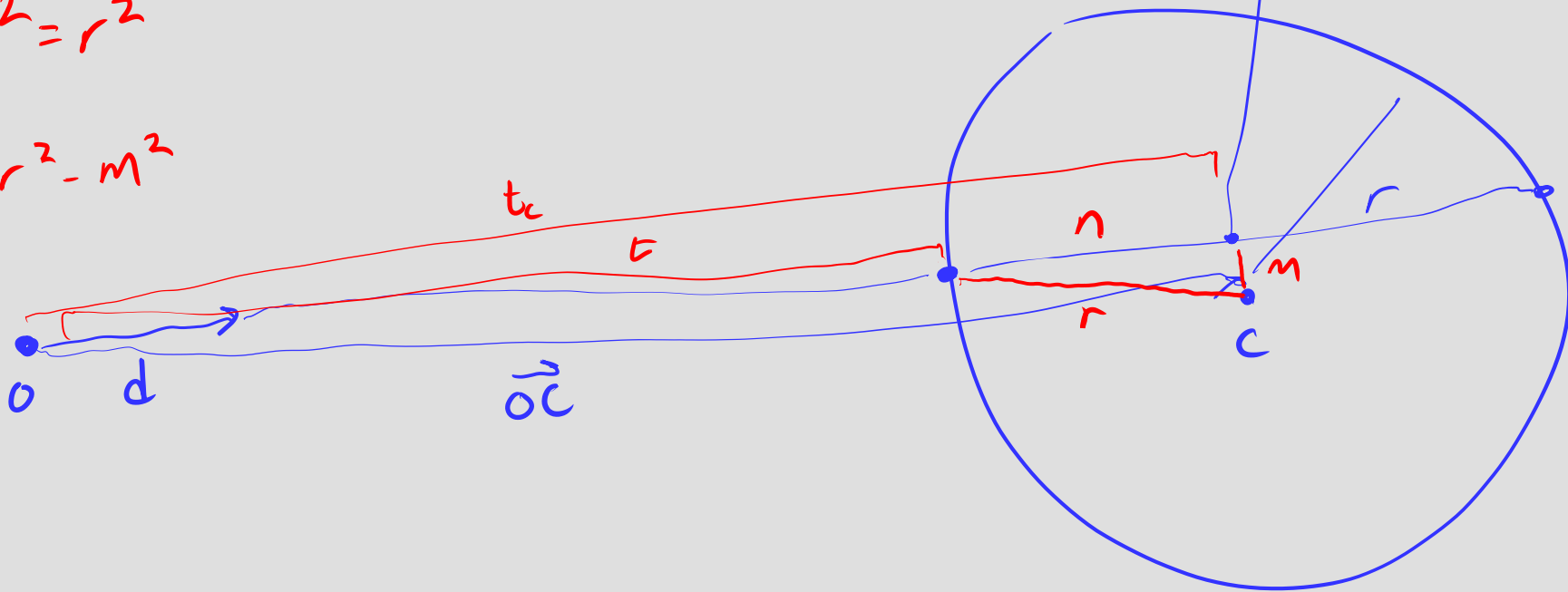
$$\vec{e}_2 \triangleq \vec{e}_2' / \left[(P_2 - P_0) \cdot \vec{e}_2' \right]$$

$$m^2 = (\vec{q}_c) \cdot (\vec{q}_c)$$

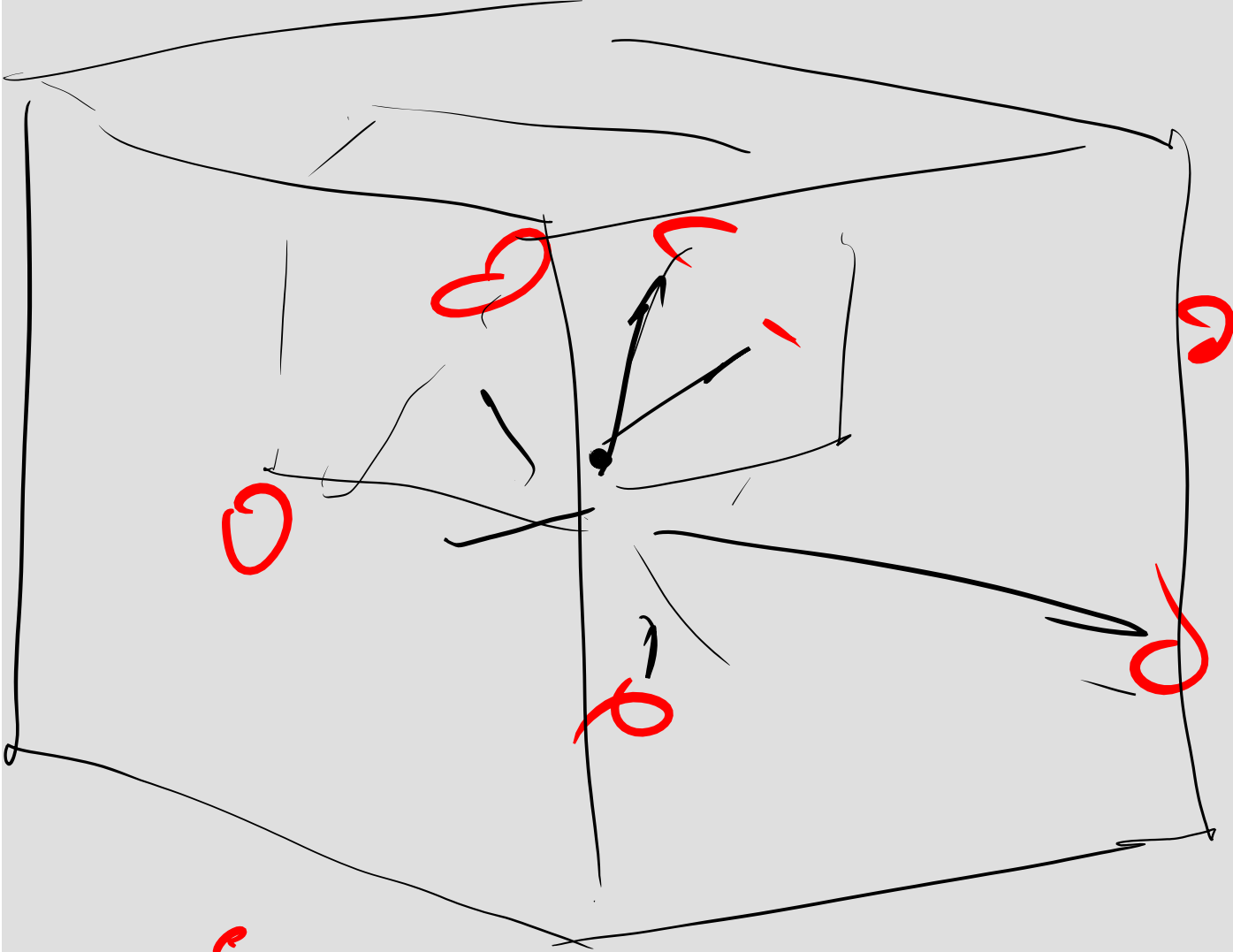
$$n^2 + m^2 = r^2$$

$$n^2 = r^2 - m^2$$

$$q = 0 + \vec{d} \cdot \underbrace{(\vec{d} \cdot \vec{OC})}_{t_c}$$



$$t = t_c - \sqrt{n^2}$$



Handwritten red annotations, including the letter 'G' and various symbols, are scattered across the page. The annotations include:

- Red 'G' characters: One is circled and located near the top-left corner of the prism. Another is located near the top-right corner. A third is located near the bottom-left corner. A fourth is located near the bottom-right corner. A fifth is located near the bottom center.
- Red symbols: Several red symbols resembling the letter 'r' or 'p' are scattered across the page, including one near the top right, one near the middle right, one near the bottom right, one near the bottom center, and one near the bottom left.

atan2

