

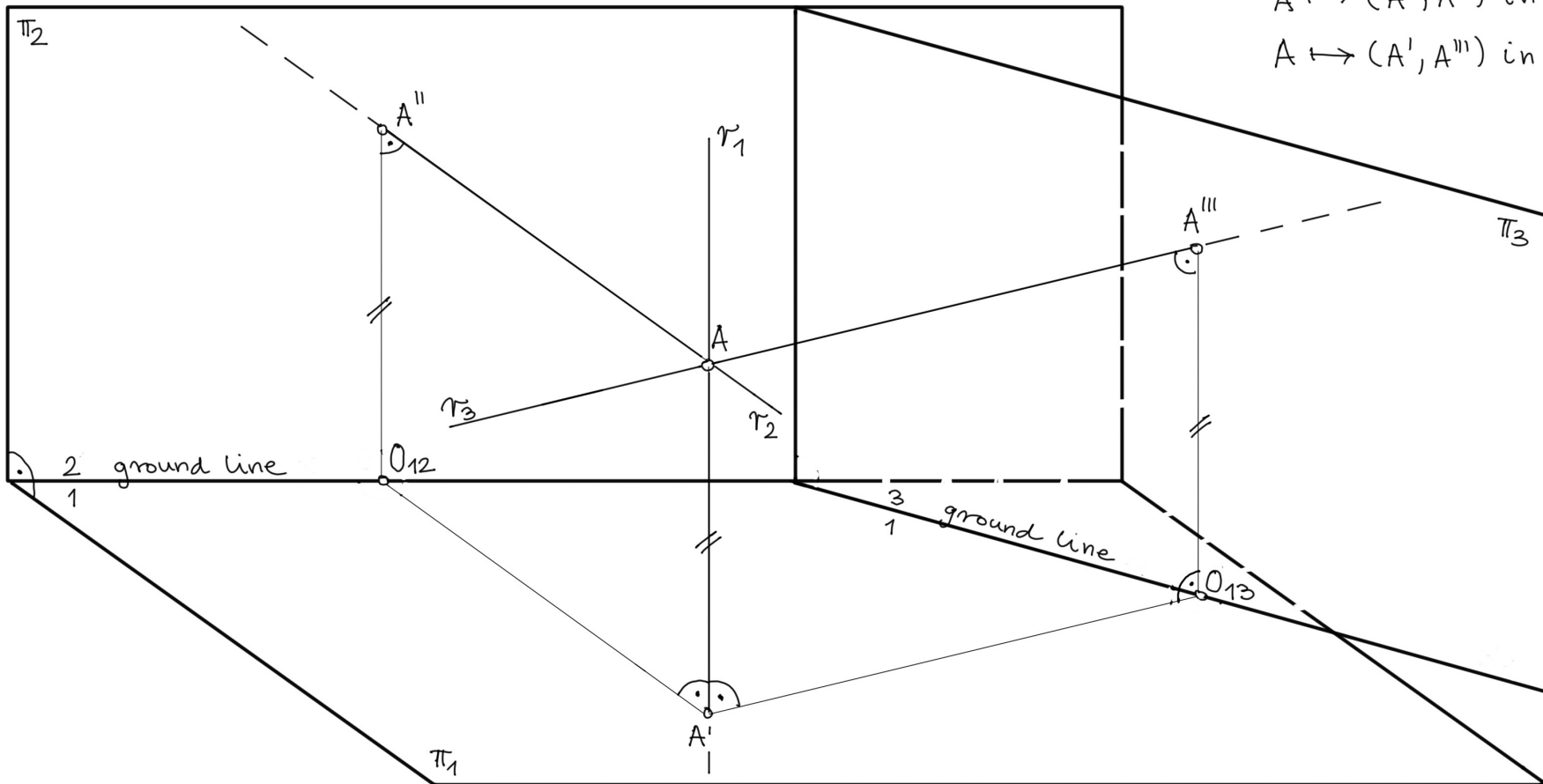
TRANSFORMATION OF THE PROJECTION PLANE SYSTEM



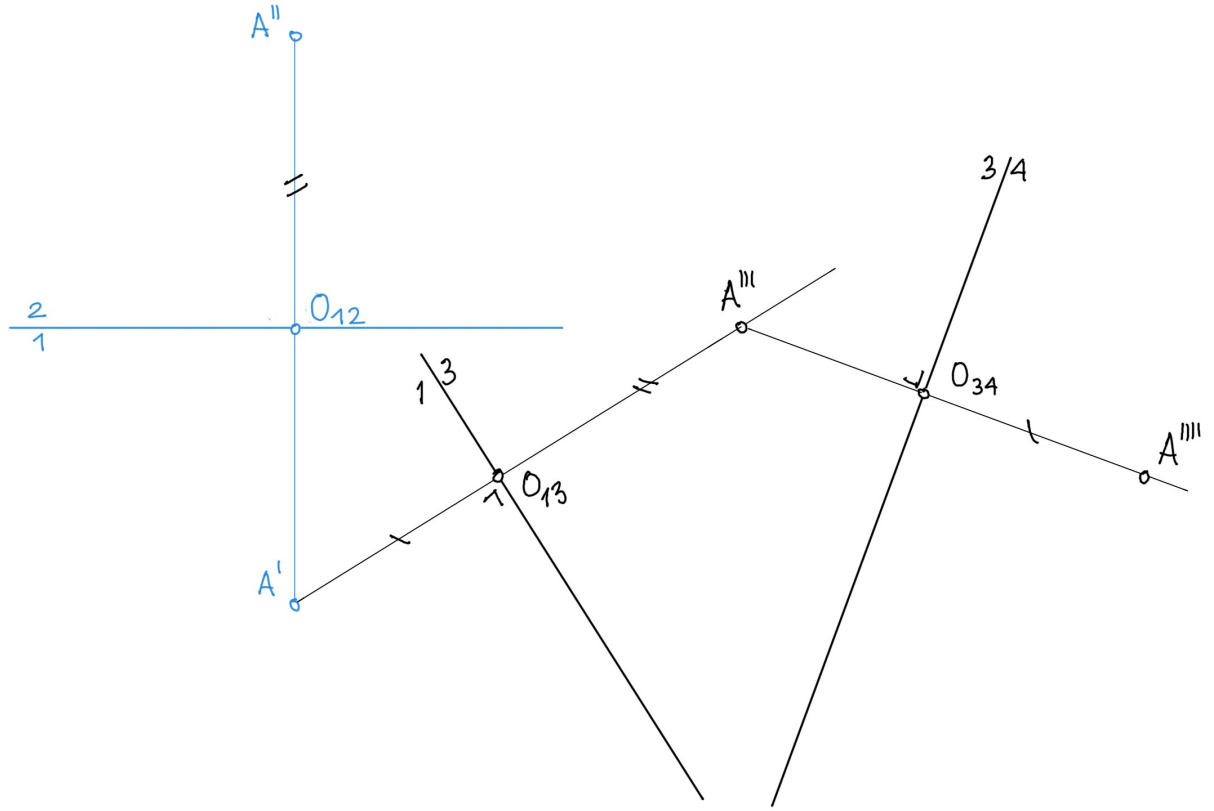
Lecture 5
7 Nov 2022

- Purpose: Same as that of rabatment → to measure distances and angles
- Rule of thumb: Additional projection plane is perpendicular to one already in use.

(π_1, π_2) system
is transformed to
 (π_1, π_3) with $\pi_3 \perp \pi_1$
 $A \mapsto (A', A'')$ in (π_1, π_2)
 $A \mapsto (A', A''')$ in (π_1, π_3)



1. Transformation of a point



Given :

$$A \mapsto (A', A'')$$

Problem :

Transform (π_1, π_2) to (π_1, π_3) , where $\pi_3 \perp \pi_1$ and next to (π_3, π_4) , where $\pi_4 \perp \pi_3$.

Solution :

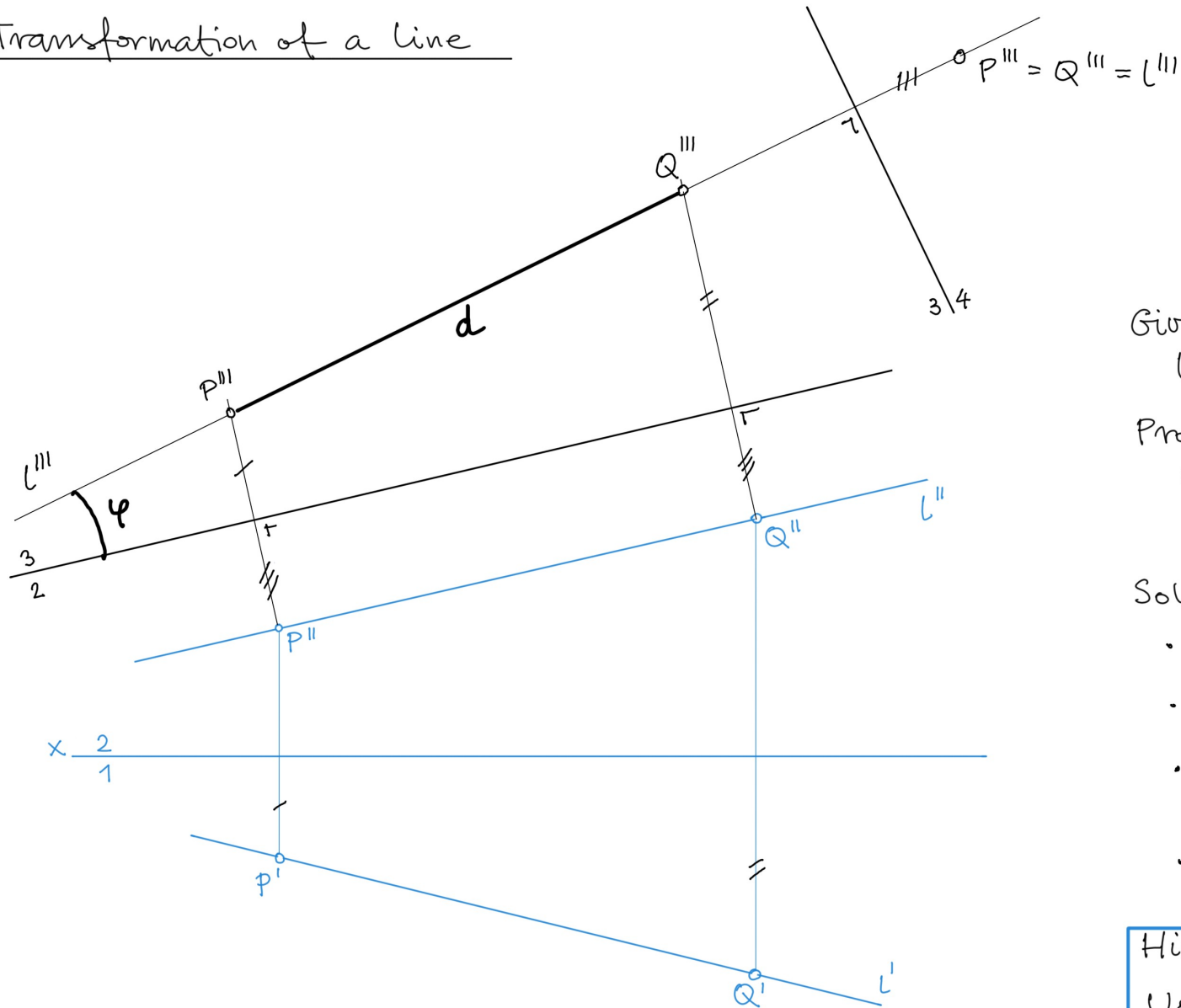
- ground line 1/3 is an intersection line of π_1 and π_3
- $A \mapsto (A', A''')$
- ground line 3/4 similarly
- $A \mapsto (A''', A''''')$

Consider the transformation of (π_1, π_2) to (π_2, π_3) and next to (π_3, π_4) , where $\pi_3 \perp \pi_2$ and $\pi_4 \perp \pi_3$

?

PRINCIPLE OF TRANSFORMATION

2. Transformation of a line



Given :

$L(P, Q)$

Problem :

Find $\varphi = \angle(L, \pi_2)$

$d = |PQ|$

Solution :

- $\pi_3 \parallel L$, ground line $2/3 \parallel L''$
- $\pi_4 \perp L$, ground line $3/4 \perp L'''$
- L in frontal position with respect to π_3
- L in projecting position with respect to π_4

Hint :

Use projection planes in special positions.

? Find $\angle(L, \pi_1)$

3. Transformation of a plane to the projecting position (edge view)

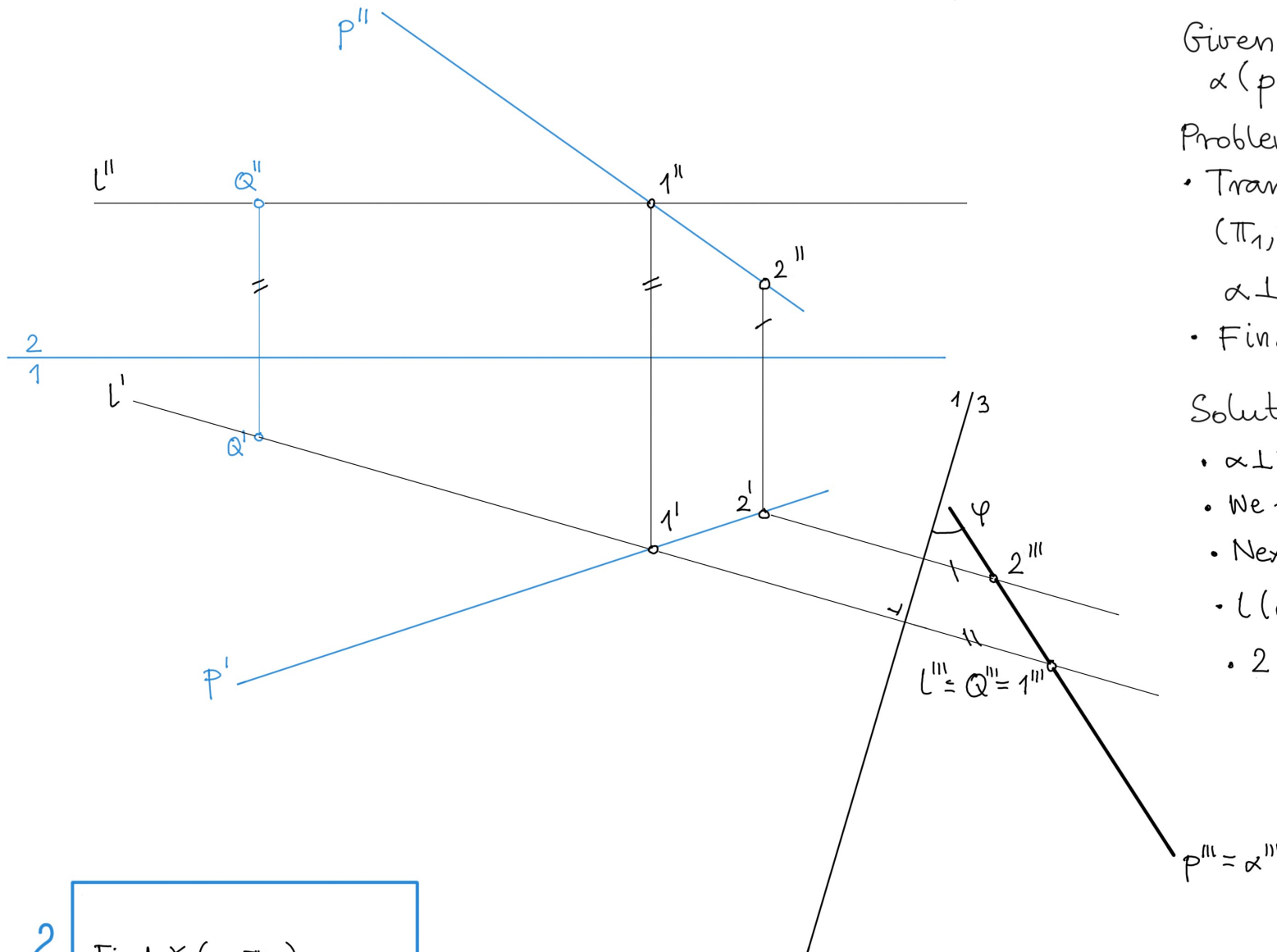
Given:
 $\alpha(p, Q), Q \notin p$

Problem:

- Transform (π_1, π_2) to (π_1, π_3) such that $\alpha \perp \pi_3$.
- Find $\varphi = \angle(\alpha, \pi_1)$

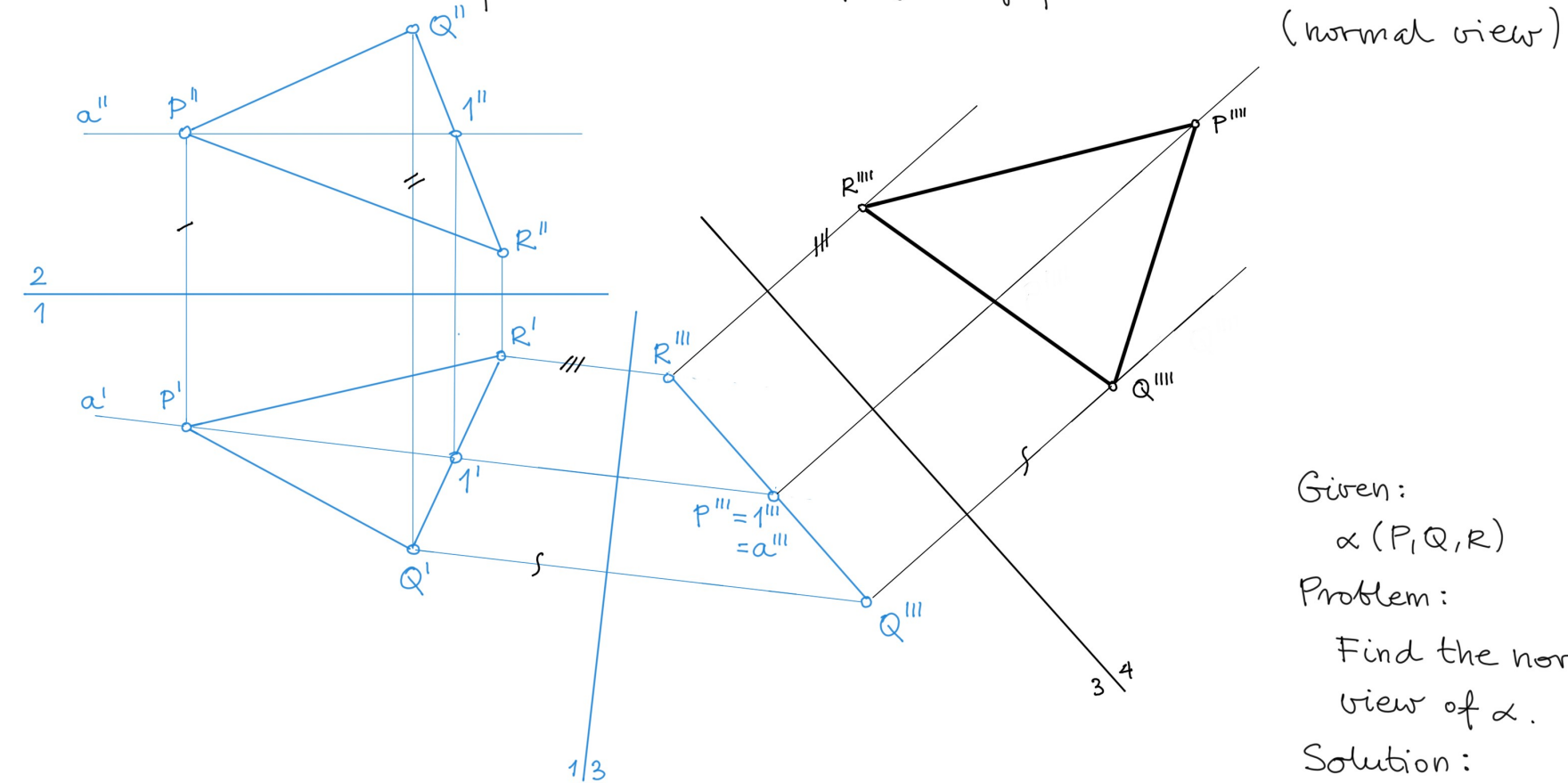
Solution:

- $\alpha \perp \pi_3$ and $\pi_3 \perp \pi_1$
- We take $L \in \alpha$ and $L \parallel \pi_1$
- Next, we take $\pi_3 \perp L$
- $L(Q, 1)$
- $2 \in p$



2. Find $\angle(\alpha, \pi_2)$

4. Transformation of a plane from the projecting position to frontal position



Given:
 $\alpha (P, Q, R)$

Problem:
 Find the normal view of α .

Solution:
 • edge view of α
 • $\Pi_4 \parallel \alpha$

Compare the techniques of rabatment and transformation of

- a point
- a line
- a plane