Exercise 1.

If $P_2 X = 0$ and $P_1 X = 0$ then they have the same camera centers. Therefore $P_2 = Q P_1$ where Q is any constant.

From 5.3: $C_i = -A_i^{-1} t_i$ is the camera center.

So, $C = -A_1^{-1} t_1 = -A_2^{-1} t_2$ and $PC = 0$ must be true.

Also they need to be in the same point in space so $t_1 = t_2$

Can also divide to intrinsic & extrinsic parameters:

Because $C_1 = C_2$ & $t_1 = t_2 \longrightarrow P = [A \; t]$

$$x_2 = [A_2 \; t] X = A_2 A_1^{-1} x_1 \longrightarrow H = A_2 A^{-1}$$

Because we can write X as $X = inv(A_1) x_1 \rightarrow x_2 = (A_2 \; t) \, inv(A_1)$

Exercise 2.

$$H = \begin{bmatrix} h_{11} & h_{12} & h_{13} \\ h_{21} & h_{22} & h_{23} \\ h_{31} & h_{32} & h_{33} \end{bmatrix}$$ has 8 degrees of freedom as it's generalized with $h_{33} = 1$

Need 4 point correspondences as each gives two equations. → Solves for 8 unknowns.

4 random points.
↓

10% is wrong. → Probability of selecting inlier = $0{,}90^4$

$$n \geq \frac{\log(1-0{,}98)}{\log(1-0{,}90^4)} \approx 3{,}66$$ so 4 iterations will be enough

Exercise 3:

Essential matrix has 5 degrees of freedom.

Need at least 8 point correspondences.

$$n \geq \frac{\log(1-0{,}98)}{\log(1-0{,}90^8)} \approx 6{,}9$$ so 7 iterations work.