

Homework 3 (due 3/26)

- Determine the Point of \mathbb{RP}^2 at which the Line through the Points $[8, -1, 2]$ and $[1, -2, -1]$ meets the Line through the Points $[0, 1, -1]$ and $[2, 3, 1]$.

- Let

$$t : [x, y, z] \mapsto [2x + y, -x + z, y + z],$$

be projective transformation from \mathbb{RP}^2 to \mathbb{RP}^2 . Find the image of the Line $x + 2y + 3z = 0$ under the projective transformation t .

- Determine the projective transformation that map the Points $[-2, 0, 1]$, $[0, 1, -1]$, $[-1, 2, -1]$, $[-1, 1, -1]$ to the Points $[0, 1, 0]$, $[1, 0, 0]$, $[-1, -1, 1]$, $[2, 1, 1]$, respectively.

- The diagram represents an aerial photograph of a straight road on flat ground. At A there is a sign "Junction 1 km", at B a sign "Junction $\frac{1}{2}$ km", and Y is the road junction. Also, a police patrol car is at X , and a bridge is at C . The distances marked on the left of the diagram are measured in cm from the photograph. Calculate the actual distances (in km) of the patrol car and the bridge from the junction.

