

EXERCISES OF WEEK THREE

Exercise 1. Given the two lines

$$\ell := \ell(P, v), \quad \ell' := \ell(Q, w)$$

find the intersection point, where

$$P = (1, 0), \quad v = (3, 4), \quad Q = (2, 1), \quad w = (0, 2)$$

Then, evaluate the distance

$$\text{dist}(R, \ell)$$

where $R = (2, 3)$.

Exercise 2. Find the parametric form of the line which contains the points

$$P_1 = (1, 3), \quad P_2 = (2, 7).$$

Find the parametric form and the normal form of the plane containing the three points

$$P = (1, 0, 1), \quad Q = (2, -1, 3), \quad R = (1, 0, 0);$$

find the parametric form and the normal form of the plane containing the following point and line (as a subset)

$$P = (1, 0, 1), \quad \ell(Q, v)$$

where

$$Q = (0, 0, 0), \quad v = (1, 1, 1).$$

Exercise 3. Given $v, w, z \in E^3$, show that

$$\begin{vmatrix} v_1 & w_1 & z_1 \\ v_2 & w_2 & z_2 \\ v_3 & w_3 & z_3 \end{vmatrix} = (v \times w) \cdot z.$$