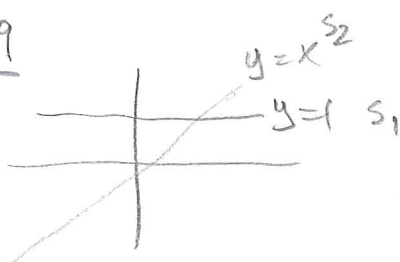


2019

1.



a) Fixpunktter for $s_1 \circ s_2$ og $s_2 \circ s_1$: (1,1)

b) Rotationscentre (1,1)

Vinkel $s_1 \circ s_2$: $\frac{3\pi}{4}$
 $s_2 \circ s_1$: $\frac{\pi}{4}$

2.

$l: x_0 + 2x_1 + x_2 = 0$

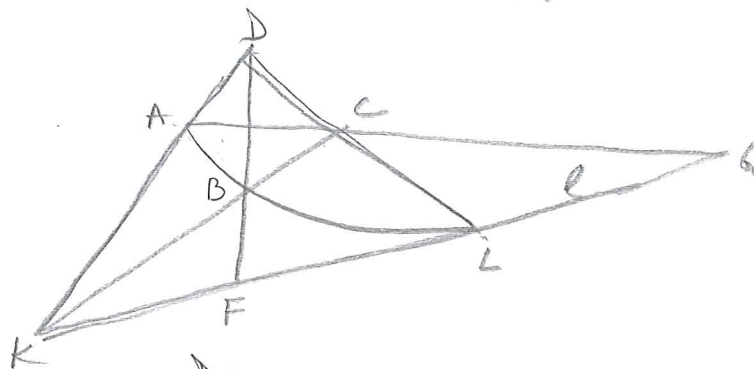
$m: x_0 - x_1 + x_2 = 0$

a) $P: \begin{vmatrix} \bar{i} & \bar{j} & \bar{k} \\ 1 & 2 & 1 \\ 1 & -1 & 1 \end{vmatrix} = (3:0:-3) = (1:0:-1)$

b) $Q = (0:-1:1)$

$PQ = \begin{vmatrix} x_0 & x_1 & x_2 \\ 1 & 0 & -1 \\ 0 & -1 & 1 \end{vmatrix} = -x_0 - x_1 - x_2 = 0$
 $x_0 + x_1 + x_2 = 0$

3.

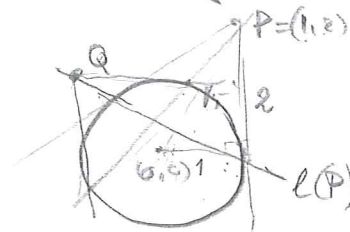


a) $\frac{DA}{AK} \cdot \frac{KF}{FL} \cdot \frac{LC}{CD} = 1$ siden $AL \cap DF \cap KC \neq \emptyset$

b) $\frac{DA}{AK} \cdot \frac{KG}{GL} \cdot \frac{LC}{CD} = -1$ siden A, G, C ligger på linje

c) $(K, L; FG) = \frac{KF}{KG} \cdot \frac{LG}{LF} = \frac{\frac{DA}{AK} \cdot \frac{KF}{FL} \cdot \frac{LC}{CD}}{\frac{DA}{AK} \cdot \frac{KG}{GL} \cdot \frac{LC}{CD}} = -1$

4.



a) $Q \in l(P) \Leftrightarrow P \in l(Q)$

$l(P)$: gitt som (1,0) stall $-\frac{1}{2}$

$y = -\frac{1}{2}(x-1) = -\frac{1}{2}x + \frac{1}{2}$

$Q = (t, -\frac{1}{2}t + \frac{1}{2})$

$|Q| = \sqrt{t^2 + \frac{1}{4}t^2 - \frac{1}{2}t + \frac{1}{4}} = \sqrt{\frac{5}{4}t^2 - \frac{1}{2}t + \frac{1}{4}}$

$\frac{1}{Q \cdot x} = \frac{(t, -\frac{1}{2}t + \frac{1}{2})}{\frac{5}{4}t^2 - \frac{1}{2}t + \frac{1}{4}}$ st. tall $\frac{t}{\frac{1}{2}t - \frac{1}{2}} = \frac{2t}{t-1}$

$= \left(\frac{1}{t} - \frac{1}{2} \right) y = \frac{-\frac{1}{2}t + \frac{1}{2}}{\frac{5}{4}t^2 - \frac{1}{2}t + \frac{1}{4}} = \frac{2t}{t-1} \left(x = \frac{t}{\frac{5}{4}t^2 - \frac{1}{2}t + \frac{1}{4}} \right)$

(1.2) ligger på denne linje

$$2 - \frac{-\frac{1}{2}t + \frac{1}{2}}{\frac{5}{4}t^2 - \frac{1}{2}t + \frac{1}{4}} = \frac{2t}{t-1} \left(1 - \frac{t}{\frac{5}{4}t^2 - \frac{1}{2}t + \frac{1}{4}}\right) \quad | \left(\frac{5}{4}t^2 - \frac{1}{2}t + \frac{1}{4}\right)(t-1)$$

$$2(t-1)\left(\frac{5}{4}t^2 - \frac{1}{2}t + \frac{1}{4}\right) - (t-1)\left(-\frac{1}{2}t + \frac{1}{2}\right) = 2t\left(\frac{5}{4}t^2 - \frac{1}{2}t + \frac{1}{4}\right) - 2t \cdot t$$

$$\frac{5}{2}t^3 - t^2 + \frac{1}{2}t - \frac{5}{2}t^2 + t - \frac{1}{2} + \frac{1}{2}t^2 - t + \frac{1}{2} = \frac{5}{2}t^3 - t^2 + \frac{t}{2} - 2t^2 \quad \text{ok}$$

b)

$$L \cap M \cap N = \{P\}$$

$$P \in L \Rightarrow P(L) \in L(P)$$

$$P \in M \Rightarrow P(M) \in L(P)$$

$$P \in N \Rightarrow \underline{\underline{P(N) \in L(P)}}$$

5.

$$P.: v=12$$

$$e=24 \quad a) f = 2 + e - v = 2 + 24 - 12 = \underline{\underline{14}}$$

b)

$$f_3 + f_4 = f \quad 3f_3 + 4f_4 = 2e$$

$$\leadsto \begin{cases} f_3 + f_4 = 14 \\ 3f_3 + 4f_4 = 48 \end{cases} \Rightarrow \underline{\underline{f_3 = 8 \quad f_4 = 6}}$$