1 1

1.1 1

Specification: Given is $g : \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -1 \\ -4 \end{pmatrix} + \lambda \begin{pmatrix} -2 \\ 5 \end{pmatrix}$

Requirements: Notate g in the normal vector form.

Exercise:

$$\vec{n} \cdot \vec{OX} = \vec{n} \cdot \vec{OP} \tag{1}$$

$$\vec{n} \cdot \begin{pmatrix} x \\ y \end{pmatrix} = \vec{n} \cdot \vec{-1-4} \tag{2}$$

$$\begin{pmatrix} -5 \\ -2 \end{pmatrix} \cdot \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -5 \\ -2 \end{pmatrix} \cdot \begin{pmatrix} -1 \\ -4 \end{pmatrix} \tag{3}$$

$$-5x - 2y = 13 \tag{4}$$

1.2 2

Specification: Given is $h : -5x + 2y = -12$.

Requirements: Notate h in the normal vector form and the parameter notation.

Exercise:

$$\vec{n} = \begin{pmatrix} -5 \\ 2 \end{pmatrix} \tag{5}$$

$$\vec{OP} = \begin{pmatrix} 0 \\ \frac{-12}{2} \end{pmatrix} \tag{6}$$

$$\begin{pmatrix} -5 \\ 2 \end{pmatrix} \cdot \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -5 \\ 2 \end{pmatrix} \cdot \begin{pmatrix} 0 \\ -6 \end{pmatrix} \tag{7}$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 0 \\ -6 \end{pmatrix} + \lambda * \begin{pmatrix} 1 \\ \frac{5}{2} \end{pmatrix} \tag{8}$$

$$\tag{9}$$

2 2

Specification: Given is a triangle $ABC : A(-7|1), B(8|4), C(5,7)$

Requirements:
1. Calculate the "side symmetries" of a and b in the parameter notation.
2. Calculate the "Schwerlinie" S_a in the normal vector form and S_c in the parameter notation.
3. Calculate angle symmetry line of β in the normal form.

Exercise:

$$\vec{OX} = \vec{OP} + \lambda * \vec{d} \tag{10}$$

$$\vec{OP} = \vec{OA} + \frac{1}{2} * \vec{AB} \tag{11}$$

$$\vec{BA} = \begin{pmatrix} 8 \\ 4 \end{pmatrix} - \begin{pmatrix} -7 \\ 1 \end{pmatrix} \tag{12}$$

$$\vec{BA} = \begin{pmatrix} 15 \\ 3 \end{pmatrix} \tag{13}$$

$$\vec{OP} = \begin{pmatrix} -7 \\ 1 \end{pmatrix} + \begin{pmatrix} \frac{15}{2} \\ \frac{3}{2} \end{pmatrix} \tag{14}$$

$$\vec{OP} = \begin{pmatrix} 0.5 \\ 2.5 \end{pmatrix} \tag{15}$$

$$\vec{d} = \vec{BA}_n \tag{16}$$

$$\vec{BA}_n = \vec{-315} \tag{17}$$

$$\vec{OX} = \begin{pmatrix} 0.5 \\ 2.5 \end{pmatrix} + \lambda * \begin{pmatrix} -3 \\ 15 \end{pmatrix} \tag{18}$$

$$\tag{19}$$