9.3 Parametervoorstellingen van lijnen.

Opgave 34:

a. 3 naar rechts en 1 omhoog is dezelfde richting als
6 naar rechts en 2 omhoog

b. ja, ja

Opgave 35:

a. $\underline{r}_k = \begin{pmatrix} 3 \\ -1 \end{pmatrix}$

$\underline{n}_k = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$

$k: \quad x + 3y = c$ door $(2,5)$

$x + 3y = 17$

b. $\underline{r}_l = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$

$\underline{n}_l = \begin{pmatrix} 2 \\ 4 \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

$l: \quad x + 2y = c$ door $(0,3)$

$x + 2y = 6$

Opgave 36:

a. $\underline{n}_k = \begin{pmatrix} 3 \\ -1 \end{pmatrix}$

$\underline{r}_k = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$

het punt $(0,-5)$ ligt op k

$\begin{cases} x = \lambda \\ y = -5 + 3\lambda \end{cases}$

b. $\underline{n}_l = \begin{pmatrix} 2 \\ 7 \end{pmatrix}$

$\underline{r}_l = \begin{pmatrix} 7 \\ -2 \end{pmatrix}$

het punt $(0,0)$ ligt op l

$\begin{cases} x = 7\lambda \\ y = -2\lambda \end{cases}$

Opgave 37:

a. $\underline{r}_k = \begin{pmatrix} 3 \\ -2 \end{pmatrix} = \underline{n}_l$

$l: \quad 3x - 2y = c$ door $(3,-7)$

$3x - 2y = 23$

b. $\underline{n}_n = \begin{pmatrix} 7 \\ -5 \end{pmatrix} = \underline{n}_m$

$\underline{r}_m = \begin{pmatrix} 5 \\ 7 \end{pmatrix}$

$\begin{cases} x = 3 + 5\lambda \\ y = -7 + 7\lambda \end{cases}$

Opgave 38:

a. $\underline{r}_m = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$

$\underline{n}_m = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

m: $x + 2y = c$ door (1,2)

$x + 2y = 5$

$\begin{cases} x - y = 2 \\ \underline{x + 2y = 5 \quad -} \end{cases}$

$-3y = -3$

$y = 1$

$x = 2 + y = 2 + 1 = 3$

$S(3,1)$

Opgave 39:

$\underline{r}_l = \begin{pmatrix} 1 \\ -3 \end{pmatrix}$

$\underline{n}_l = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$

l: $3x + y = c$ door $(-3,1)$

$3x + y = -8$

bissectrice van k en l:

$\frac{|x + 3y + 7|}{\sqrt{10}} = \frac{|3x + y + 8|}{\sqrt{10}}$

$|x + 3y + 7| = |3x + y + 8|$

$x + 3y + 7 = 3x + y + 8 \quad \vee \quad x + 3y + 7 = -3x - y - 8$

$-2x + 2y = 1 \quad \vee \quad 4x + 4y = -15$

$\begin{cases} -2x + 2y = 1 \quad \times 2 \\ 4x + 3y = -1 \quad \times 1 \end{cases}$ $\qquad$ $\begin{cases} 4x + 4y = -15 \\ \underline{4x + 3y = -1 \quad -} \end{cases}$

$\begin{cases} -4x + 4y = 2 \\ \underline{4x + 3y = -1 \quad +} \end{cases}$

$7y = 1$

$y = \frac{1}{7}$ en $x = -\frac{5}{14}$

$y = -14$ en $x = 10\frac{1}{4}$

Opgave 40:

a. $P(2,0)$

$AP = \sqrt{2^2 + 4^2} = \sqrt{20} = 2\sqrt{5}$

$\underline{r}_{AP} = \begin{pmatrix} 2 \\ -4 \end{pmatrix} = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$

$\underline{r}_{PQ} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$

$\left|\underline{r}_{PQ}\right| = \sqrt{2^2 + 1^2} = \sqrt{5}$

$Q = P + 1 \cdot \begin{pmatrix} 2 \\ 1 \end{pmatrix} = (2,0) + \begin{pmatrix} 2 \\ 1 \end{pmatrix} = (4,1)$

b. $P(4,0)$

$AP = \sqrt{4^2 + 4^2} = \sqrt{32} = 4\sqrt{2}$

$PQ = 2\sqrt{2}$

$\underline{r}_{AP} = \begin{pmatrix} 4 \\ -4 \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$

$\underline{r}_{PQ} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

$\left|\underline{r}_{PQ}\right| = \sqrt{1^2 + 1^2} = \sqrt{2}$

$Q = P + 2 \cdot \begin{pmatrix} 1 \\ 1 \end{pmatrix} = (4,0) + \begin{pmatrix} 2 \\ 2 \end{pmatrix} = (6,2)$

c. $P(6,0)$

$AP = \sqrt{4^2 + 6^2} = \sqrt{52} = 2\sqrt{13}$

$PQ = \sqrt{13}$

$\underline{r}_{AP} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$

$\underline{r}_{PQ} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$

$\left|\underline{r}_{PQ}\right| = \sqrt{3^2 + 2^2} = \sqrt{13}$

$Q = P + 1 \cdot \begin{pmatrix} 2 \\ 3 \end{pmatrix} = (6,0) + \begin{pmatrix} 2 \\ 3 \end{pmatrix} = (8,3)$

d. ja

$\underline{r} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$ dus $\underline{n} = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$

$x - 2y = c$ door $(4,1)$

$x - 2y = 2$

Opgave 41:

$P(0,\lambda)$

$AP = \sqrt{6^2 + \lambda^2} = \sqrt{36 + \lambda^2}$

$\underline{r}_{PA} = \begin{pmatrix} 6 \\ -\lambda \end{pmatrix}$

$\underline{r}_{PQ} = \begin{pmatrix} \lambda \\ 6 \end{pmatrix}$

$Q = P + \frac{2}{3} \cdot \begin{pmatrix} \lambda \\ 6 \end{pmatrix} = (0,\lambda) + \frac{2}{3} \cdot \begin{pmatrix} \lambda \\ 6 \end{pmatrix} = (\frac{2}{3}\lambda, 4 + \lambda)$

dus Q ligt op de lijn: $\begin{cases} x = \frac{2}{3}\lambda \\ y = 4 + \lambda \end{cases}$

$\underline{r} = \begin{pmatrix} \frac{2}{3} \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ dus $\underline{n} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$

$3x - 2y = c$ door $(0,4)$

$3x - 2y = -8$

Opgave 42:

$P(6 + \lambda, 0)$ dan $Q(0, 2 + 2\lambda)$

$M(3 + \frac{1}{2}\lambda, 1 + \lambda)$

Punt M beweegt over de lijn l: $\begin{cases} x = 3 + \frac{1}{2}\lambda \\ y = 1 + \lambda \end{cases}$

$\underline{s}_l = (3,1)$ en $\underline{r}_l = \begin{pmatrix} \frac{1}{2} \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

$\underline{n}_l = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$

l: $2x - y = c$ door $(3,1)$

l: $2x - y = 5$

Opgave 43:

$\underline{r}_{OQ} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$

$\left|\underline{r}_{OQ}\right| = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$

stel $Q = (3\lambda, 4\lambda)$ dan heeft Q snelheid 5

dan geldt: $P(10\lambda, 0)$

$M = (6\frac{1}{2}\lambda, 2\lambda)$

$\underline{r} = \begin{pmatrix} 6\frac{1}{2} \\ 2 \end{pmatrix} = \begin{pmatrix} 13 \\ 4 \end{pmatrix}$

$\underline{n} = \begin{pmatrix} 4 \\ -13 \end{pmatrix}$

$4x - 13y = 0$

Opgave 44:

$P(\lambda, \lambda)$

$\underline{r}_{AP} = \begin{pmatrix} \lambda \\ \lambda - 4 \end{pmatrix}$

$\underline{r}_{PQ} = \begin{pmatrix} 4 - \lambda \\ \lambda \end{pmatrix}$

$Q = P + \frac{2}{3} \cdot \underline{r}_{PQ} = (\lambda, \lambda) + \frac{2}{3} \cdot \begin{pmatrix} 4 - \lambda \\ \lambda \end{pmatrix} = (\frac{8}{3} + \frac{1}{3}\lambda, \frac{5}{3}\lambda)$

$\underline{r} = \begin{pmatrix} \frac{1}{3} \\ \frac{5}{3} \end{pmatrix} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$

$\underline{n} = \begin{pmatrix} 5 \\ -1 \end{pmatrix}$

$5x - y = c$ door $(-\frac{8}{3}, 0)$

$5x - y = 13\frac{1}{3}$