Hallo Waldorf :-)

(12) - (19)

(1) 15.6.19

E: $4x_1 - x_2 + 2x_3 = 4$

F: $x_2 + 2x_3 = 8 \quad |-2x_3$

$t \in \mathbb{R}$

$x_2 = 8 - 2x_3$

$x_3 = t$

$x_2 = 8 - 2t$

(2)

$4x_1 - (8 - 2t) + 2t = 4$

$4x_1 - 8 + 2t + 2t = 4 \quad |+8 \; |-4t$

$4x_1 = 12 - 4t \quad |:4$

$x_1 = 3 - t$

(3)

$x_1 = 3 - t$

$x_2 = 8 - 2t$

$x_3 = t$

(4)

$g: \vec{x} = \begin{pmatrix} 3 \\ 8 \\ 0 \end{pmatrix} + t \begin{pmatrix} -1 \\ -2 \\ 1 \end{pmatrix}$

13 $r_h \cdot \vec{n} = 0$

h: Stützvektor von E

(14) $g: \vec{x} = \begin{pmatrix} 1 \\ -1 \\ 3 \end{pmatrix} + t \begin{pmatrix} 1 \\ -2 \\ -3 \end{pmatrix} = \begin{pmatrix} 1+1t \\ -1-2t \\ 3-3t \end{pmatrix}$

$t \in \mathbb{R}$ ✓

$E: \; x - 2y - 3z = \begin{pmatrix} 1 \\ -2 \\ -3 \end{pmatrix} \circ \begin{pmatrix} 4 \\ 3 \\ -8 \end{pmatrix}$

22

g in E:

$22 = (1+1t) - 2(-1-2t) - 3(3-3t)$

$22 = 1 + 1t + 2 + 4t - 9 + 9t \quad | + 6$

$28 = 14t \quad | : 14 \quad t = 2$ ✓

g & g

$\vec{RV}_1 \; \# \; s \cdot \vec{RV}_2$

ja → Vielfache

nein → LGS

Vielfache → ja → identisch

Vielfache → nein → parallel

LGS → Lösung → Schneiden sich

LGS → keine Lösung → windschief

E ∥ g  E ∦ E

LGS

LGS → keine Lösung → parallel

LGS → Lösung → Schnittgerade / Schnittpunkt

LGS → unendl. viele Lösungen → identisch

$S(3|-5|-3)$

14b) Punktprobe:

$$\begin{array}{rcl|l} 3 &=& 1+1s & -1 \\ -5 &=& -1-2s & +1 \\ -3 &=& 3-3s & -3 \end{array}$$

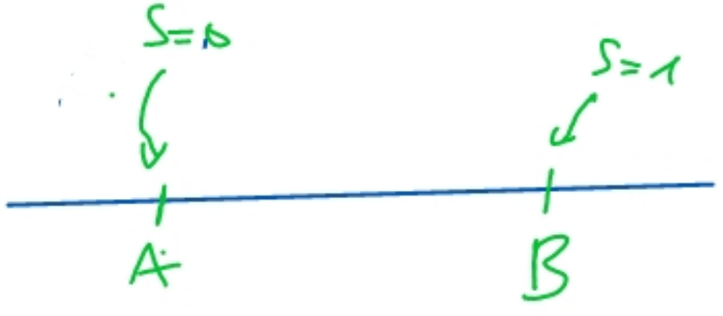
$2 = s$ $\quad s=2$

$-4 = -2s \quad | \cdot (-2)$ $\quad s=2$

$-8 = -3s \quad | : (-3)$ $\quad s=2$

damit gilt:

$0 \leq s \leq 1$




$g: \vec{x} = \overrightarrow{OA} + s\overrightarrow{AB}$

17 Gerade & Würfel:

$r = -3$ $\quad S(-5|-6|4)$

$S = -5$

$X(-5|-1+5|-1-5)$

$|\vec{PX}| = 18\,[LE]$

$x_1(-5|-9|7)$ $\quad S_1 = -8$

$x_2(-5|9|-11)$ $\quad S_2 = 10$

$|\vec{PX}| = \sqrt{(-5-7)^2 + (-1+5-3)^2 + (-1-5-1)^2}$

$\rightarrow$ X-CALC mit $y = 18$

5) I

$M(0|0|0)$

II

$S(-4|4|2)$

$r = 3$ (Gerade)

$0 = 3 - 3r$

$0 = -2 + 2r$ $\quad r = 1$

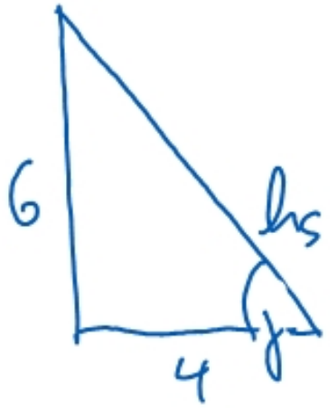
$0 = -1 + 1r$

(18) Tusm

$\vec{n}_1 = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$ $\vec{n}_2 = \begin{pmatrix} 0 \\ -6 \\ -4 \end{pmatrix}$

$\gamma = 56{,}31°$

$\vec{FG} \times \vec{FS}$




$\tan\gamma = \frac{6}{4} \mid \tan^{-1}$

$A = 115{,}4\ m^2$

$A = 4 \, A_\Delta$

$S'(18\,|\,4\,|\,8)$

$z'(8\,|\,5\,|\,6)$

$z(8\,|\,5\,|\,0)$

$\ell_B = |\vec{PZ}| = \left|\begin{pmatrix} -10 \\ 1 \\ 0 \end{pmatrix}\right| = \sqrt{101}$

$\ell_\omega = |Zz'| = \left|\begin{pmatrix} 0 \\ 0 \\ 6 \end{pmatrix}\right| = 6$

$A_\Delta = \frac{1}{2} \cdot g \cdot h$

$A_\Delta = \frac{1}{2} \left|\vec{FS} \times \vec{FG}\right|$

$A_\Delta = \frac{1}{2} \left|\begin{pmatrix} 0 \\ -48 \\ -32 \end{pmatrix}\right|$

$= \frac{1}{2} \sqrt{48^2 + 32^2}$