

AG3.4 Geraden (Lösungen)

Lösungen Maturaaufgaben:

- 1) Gehe zum Aufgabenpool Mathematik AHS: <https://prod.aufgabenpool.at/amn/index.php?id=M>
- 2) Gib im Feld „Volltextsuche“ die **Nummer** ein. Du kommst zur zugehörigen Aufgabe. Die Lösungen sind bei der Aufgabe enthalten.

Grundkompetenz

Aufgabentyp ▾

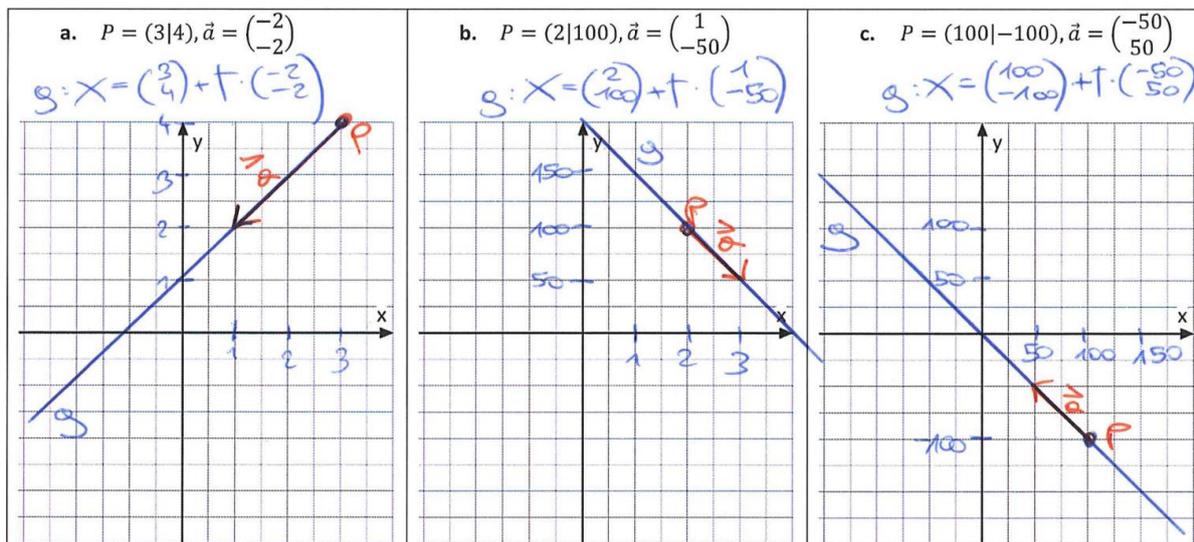
Schulstufe ▾

Volltextsuche

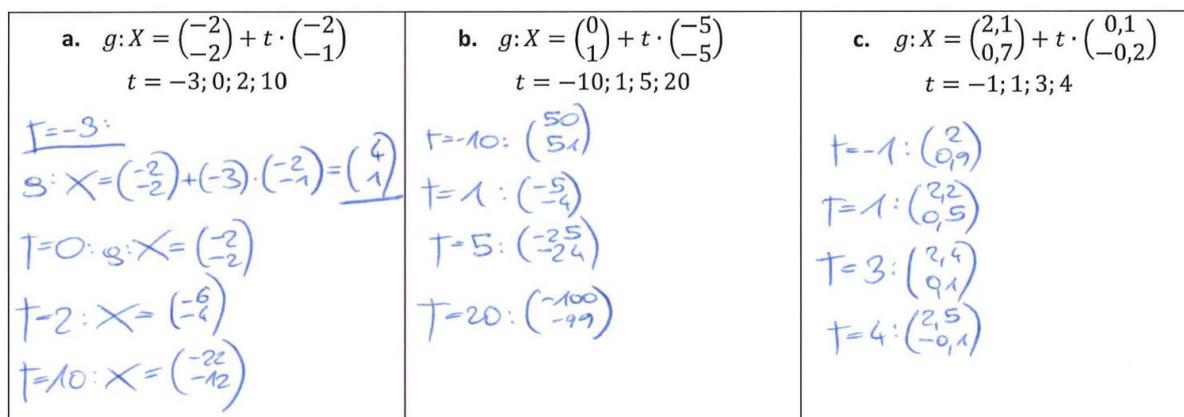
Angestelltenghalt* 1_578, AN1.1, Offenes Antwortformat

↑
Nummer

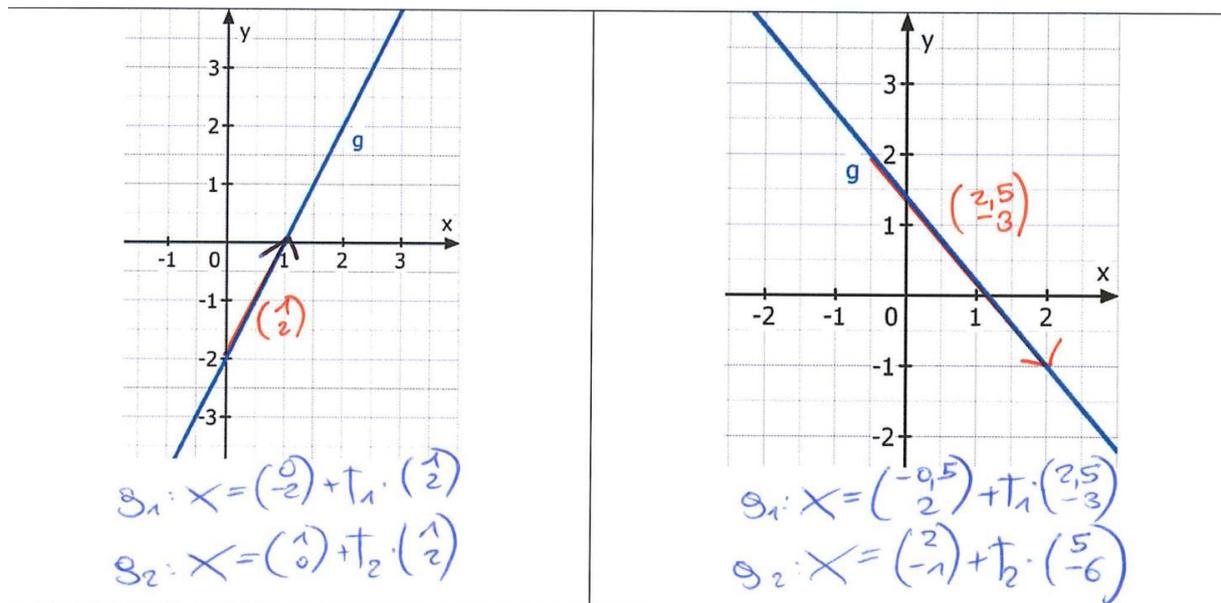
Bsp. 1)



Bsp. 2)



Bsp. 3)



Bsp. 4)

<p>a. $P = (3 4 1), \vec{a} = \begin{pmatrix} -1 \\ 3 \\ -2 \end{pmatrix}$</p> <p>$g: X = \begin{pmatrix} 3 \\ 4 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} -1 \\ 3 \\ -2 \end{pmatrix}$</p> <p>① $t=1: X = \begin{pmatrix} 3 \\ 4 \\ 1 \end{pmatrix} + 1 \cdot \begin{pmatrix} -1 \\ 3 \\ -2 \end{pmatrix} = \begin{pmatrix} 2 \\ 7 \\ -1 \end{pmatrix}$</p> <p>② $t=-2: X = \begin{pmatrix} 3 \\ 4 \\ 1 \end{pmatrix} + (-2) \cdot \begin{pmatrix} -1 \\ 3 \\ -2 \end{pmatrix} = \begin{pmatrix} 5 \\ -2 \\ 5 \end{pmatrix}$</p> <p>③ $t=10: X = \begin{pmatrix} 3 \\ 4 \\ 1 \end{pmatrix} + 10 \cdot \begin{pmatrix} -1 \\ 3 \\ -2 \end{pmatrix} = \begin{pmatrix} -7 \\ 34 \\ -19 \end{pmatrix}$</p> <p>Werte für t können beliebig gewählt werden!</p>	<p>b. $P = (-1 7 4), \vec{a} = \begin{pmatrix} -4 \\ 12 \\ 2 \end{pmatrix}$</p> <p>$g: X = \begin{pmatrix} -1 \\ 7 \\ 4 \end{pmatrix} + t \cdot \begin{pmatrix} -4 \\ 12 \\ 2 \end{pmatrix}$</p> <p>① $t=2: \begin{pmatrix} -1 \\ 7 \\ 4 \end{pmatrix} + 2 \cdot \begin{pmatrix} -4 \\ 12 \\ 2 \end{pmatrix} = \begin{pmatrix} -9 \\ 31 \\ 8 \end{pmatrix}$</p> <p>② $t=-5: \begin{pmatrix} -1 \\ 7 \\ 4 \end{pmatrix} + (-5) \cdot \begin{pmatrix} -4 \\ 12 \\ 2 \end{pmatrix} = \begin{pmatrix} 19 \\ -53 \\ -6 \end{pmatrix}$</p> <p>③ $t=-1: \begin{pmatrix} -1 \\ 7 \\ 4 \end{pmatrix} + (-1) \cdot \begin{pmatrix} -4 \\ 12 \\ 2 \end{pmatrix} = \begin{pmatrix} 3 \\ -5 \\ 2 \end{pmatrix}$</p>	<p>c. $P = (13 -4 11), \vec{a} = \begin{pmatrix} -1 \\ -1 \\ 1 \end{pmatrix}$</p> <p>$g: X = \begin{pmatrix} 13 \\ -4 \\ 11 \end{pmatrix} + t \cdot \begin{pmatrix} -1 \\ -1 \\ 1 \end{pmatrix}$</p> <p>① $t=10: \begin{pmatrix} 13 \\ -4 \\ 11 \end{pmatrix} + 10 \cdot \begin{pmatrix} -1 \\ -1 \\ 1 \end{pmatrix} = \begin{pmatrix} 3 \\ -14 \\ 21 \end{pmatrix}$</p> <p>② $t=-20: \begin{pmatrix} 13 \\ -4 \\ 11 \end{pmatrix} + (-20) \cdot \begin{pmatrix} -1 \\ -1 \\ 1 \end{pmatrix} = \begin{pmatrix} 33 \\ 16 \\ 9 \end{pmatrix}$</p> <p>③ $t=5: \begin{pmatrix} 13 \\ -4 \\ 11 \end{pmatrix} + 5 \cdot \begin{pmatrix} -1 \\ -1 \\ 1 \end{pmatrix} = \begin{pmatrix} 8 \\ -9 \\ 16 \end{pmatrix}$</p>
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Bsp. 5)

<p>a. $g: X = \begin{pmatrix} 0 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} -5 \\ 3 \end{pmatrix} - P = (x 7)$</p> <p>I $\begin{pmatrix} x \\ 7 \end{pmatrix} = \begin{pmatrix} 0 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} -5 \\ 3 \end{pmatrix}$</p> <p>II $7 = 1 + 3t + 1 - 1$</p> <p>$6 = 3t + 1 : : 3$</p> <p>$t = 2$</p> <p>I $\Rightarrow x = 0 - 5t = -10$</p>	<p>b. $g: X = \begin{pmatrix} -3 \\ 6 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ -1 \end{pmatrix} - P = (1 y)$</p> <p>I $\begin{pmatrix} 1 \\ y \end{pmatrix} = \begin{pmatrix} -3 \\ 6 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ -1 \end{pmatrix}$</p> <p>II $1 = -3 - 2t + 1 + 3$</p> <p>$4 = -2t + 1 : : (-2)$</p> <p>$t = -2$</p> <p>$\Rightarrow y = 6 - t = 6 - (-2) = 8$</p>
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Bsp. 6)

<p>a. $g: X = \begin{pmatrix} 2 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 3 \end{pmatrix} - P_1 = (-4 7), P_2 = (8 -6)$</p> <p>$P_1 = (-4 7)$ $\begin{pmatrix} -4 \\ 7 \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ $I: -4 = 2 - 2t + 1 - 2$ $-6 = -2t + 1 \cdot (-2)$ $t = 3$</p> <p>$P_2 = (8 -6)$ $\begin{pmatrix} 8 \\ -6 \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ $I: 8 = 2 - 2t + 1 - 2$ $6 = -2t + 1 \cdot (-2)$ $t = -3$</p> <p>$II: 7 = 1 + 3t + 1 - 1$ $6 = 3t + 1 \cdot 3 \neq$ $t = 2$</p> <p>$P_1 \notin g$</p>	<p>b. $g: X = \begin{pmatrix} -3 \\ -4 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 3 \end{pmatrix} - P_1 = (-5 -1), P_2 = (3 5)$</p> <p>$P_1 = (-5 -1)$ $\begin{pmatrix} -5 \\ -1 \end{pmatrix} = \begin{pmatrix} -3 \\ -4 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ $I: -5 = -3 - 2t + 1 + 3$ $-2 = -2t + 1 \cdot (-2)$ $t = 1$</p> <p>$P_2 = (3 5)$ $\begin{pmatrix} 3 \\ 5 \end{pmatrix} = \begin{pmatrix} -3 \\ -4 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ $I: 3 = -3 - 2t + 1 + 3$ $6 = -2t + 1 \cdot (-2)$ $t = -3$</p> <p>$II: -1 = -4 + 3t + 1 + 4$ $3 = 3t + 1 \cdot 3$ $t = 1$</p> <p>$P_1 \in g$</p>
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Bsp. 7)

<p>a. $g: X = \begin{pmatrix} -7 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 6 \end{pmatrix} - P = (7 5)$</p> <p>① $g_1: X = \begin{pmatrix} 7 \\ 5 \end{pmatrix} + t_1 \cdot \begin{pmatrix} -2 \\ 6 \end{pmatrix} \quad g_1 \parallel g$</p> <p>② $\vec{n}_g = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$</p> <p>$g_2: X = \begin{pmatrix} 7 \\ 5 \end{pmatrix} + t_2 \cdot \begin{pmatrix} 6 \\ 2 \end{pmatrix} \quad g_2 \perp g$</p>	<p>b. $g: X = \begin{pmatrix} -3 \\ 5 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 4 \end{pmatrix} - P = (-7 1)$</p>
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Bsp. 8)

<p>a. $g: X = \begin{pmatrix} 7 \\ 3 \end{pmatrix} + t \cdot \begin{pmatrix} -8 \\ 1 \end{pmatrix} \quad \vec{n} = \begin{pmatrix} 1 \\ 8 \end{pmatrix}$</p> <p>$g_1: X = \begin{pmatrix} 7 \\ 3 \end{pmatrix} + t_1 \cdot \begin{pmatrix} 1 \\ 8 \end{pmatrix}$</p> <p>$g_2: X = \begin{pmatrix} 7 \\ 3 \end{pmatrix} + t_2 \cdot \begin{pmatrix} 2 \\ 16 \end{pmatrix}$</p>	<p>b. $g: X = \begin{pmatrix} 4 \\ 5 \end{pmatrix} + t \cdot \begin{pmatrix} -3 \\ -6 \end{pmatrix} \quad \vec{n} = \begin{pmatrix} -6 \\ 3 \end{pmatrix}$</p> <p>$g_1: X = \begin{pmatrix} 4 \\ 5 \end{pmatrix} + t_1 \cdot \begin{pmatrix} -6 \\ 3 \end{pmatrix}$</p> <p>$g_2: X = \begin{pmatrix} 4 \\ 5 \end{pmatrix} + t_2 \cdot \begin{pmatrix} +6 \\ -3 \end{pmatrix}$</p>
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Bsp. 9)

<p>a. $g: X = \begin{pmatrix} 2 \\ -4 \\ -3 \end{pmatrix} + t \cdot \begin{pmatrix} -5 \\ 3 \\ -2 \end{pmatrix} - P = (x 11 z)$</p> <p>2. Gleichung: $II: -4 + 3t = 11 + 4$ $3t = 15 \quad :3$ $t = 5$</p> <p>$X = \begin{pmatrix} 2 \\ -4 \\ -3 \end{pmatrix} + 5 \cdot \begin{pmatrix} -5 \\ 3 \\ -2 \end{pmatrix} = \begin{pmatrix} 2 \\ -4 \\ -3 \end{pmatrix} + \begin{pmatrix} -25 \\ 15 \\ -10 \end{pmatrix} = \begin{pmatrix} -23 \\ 11 \\ -13 \end{pmatrix}$</p> <p>$\Rightarrow x = -23, z = -13$</p>	<p>b. $g: X = \begin{pmatrix} -4 \\ 5 \\ -3 \end{pmatrix} + t \cdot \begin{pmatrix} 0,3 \\ -0,6 \\ 0,5 \end{pmatrix} - P = (x y 1)$</p> <p>3. Gleichung: $-3 + 0,5 \cdot t = 1 + 3$ $0,5 \cdot t = 4 \quad :0,5$ $t = 8$</p> <p>$\Rightarrow X = \begin{pmatrix} -4 \\ 5 \\ -3 \end{pmatrix} + 8 \cdot \begin{pmatrix} 0,3 \\ -0,6 \\ 0,5 \end{pmatrix} = \begin{pmatrix} -4 \\ 5 \\ -3 \end{pmatrix} + \begin{pmatrix} 2,4 \\ -4,8 \\ 4 \end{pmatrix} = \begin{pmatrix} -1,6 \\ 0,2 \\ 1 \end{pmatrix}$</p>
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Geraden im \mathbb{R}^3

$\Rightarrow x = -1,6$
 $y = 0,2$

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Bsp. 10)

<p>a. $g: X = \begin{pmatrix} -3 \\ -2 \\ 2 \end{pmatrix} + t \cdot \begin{pmatrix} 4 \\ 4 \\ -1 \end{pmatrix} - P = (11 12 -1,5)$</p> <p>$\begin{pmatrix} 11 \\ 12 \\ -1,5 \end{pmatrix} = \begin{pmatrix} -3 \\ -2 \\ 2 \end{pmatrix} + t \cdot \begin{pmatrix} 4 \\ 4 \\ -1 \end{pmatrix}$</p> <p>I $11 = -3 + 4t + 1 + 3$ II $12 = -2 + 4t$ III $-1,5 = 2 - t + 2$</p> <p>$14 = 4t + 1 \cdot 4$ $14 = 4t$ $-3,5 = -1 + 4t$</p> <p>$3,5 = t$ $3,5 = t$ $3,5 = t$</p> <p style="text-align: center;">$P \in g$</p>	<p>b. $g: X = \begin{pmatrix} -6 \\ 7 \\ 11 \end{pmatrix} + t \cdot \begin{pmatrix} 0,5 \\ 1 \\ -2,5 \end{pmatrix} - P = (-1 17 -13)$</p> <p>$\begin{pmatrix} -1 \\ 17 \\ -13 \end{pmatrix} = \begin{pmatrix} -6 \\ 7 \\ 11 \end{pmatrix} + t \cdot \begin{pmatrix} 0,5 \\ 1 \\ -2,5 \end{pmatrix}$</p> <p>I $-1 = -6 + 0,5t$ II $17 = 7 + t$ III $-13 = 11 - 2,5t$</p> <p>$5 = 0,5t + 1 \cdot 0,5$ $10 = t$ $-24 = -2,5t$</p> <p>$10 = t$ $10 = t$ $9,6 = t$</p> <p style="text-align: center;">$P \notin g$</p>
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Bsp. 11)

<p>a. $g: X = \begin{pmatrix} 2 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 4 \end{pmatrix} \quad \vec{n} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$</p> <p>$\vec{n} \cdot X = \vec{n} \cdot P$</p> <p>$\begin{pmatrix} 4 \\ 2 \end{pmatrix} \cdot X = \begin{pmatrix} 4 \\ 2 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ 1 \end{pmatrix}$</p> <p>$4x + 2y = 8 + 2$</p> <p>$4x + 2y = 10$</p>	<p>b. $g: X = \begin{pmatrix} -1 \\ -4 \end{pmatrix} + t \cdot \begin{pmatrix} 3 \\ -3 \end{pmatrix} \quad \vec{n} = \begin{pmatrix} 3 \\ 3 \end{pmatrix}$</p> <p>$\begin{pmatrix} 3 \\ 3 \end{pmatrix} \cdot X = \begin{pmatrix} 3 \\ 3 \end{pmatrix} \cdot \begin{pmatrix} -1 \\ -4 \end{pmatrix}$</p> <p>$3x + 3y = -15$</p>
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Bsp. 12)

<p>a. $A = (-2 1), B = (3 7)$</p> <p>$\vec{AB} = \begin{pmatrix} 5 \\ 6 \end{pmatrix} \Rightarrow \vec{n}_{AB} = \begin{pmatrix} 6 \\ -5 \end{pmatrix}$</p> <p>$\begin{pmatrix} 6 \\ -5 \end{pmatrix} \cdot X = \begin{pmatrix} 6 \\ -5 \end{pmatrix} \cdot \begin{pmatrix} -2 \\ 1 \end{pmatrix}$</p> <p>$6x - 5y = -17$</p>	<p>b. $A = (4 2), B = (-2 -5)$</p> <p>$\vec{AB} = \begin{pmatrix} -6 \\ -7 \end{pmatrix} \Rightarrow \vec{n}_{AB} = \begin{pmatrix} -7 \\ 6 \end{pmatrix}$</p> <p>$\begin{pmatrix} -7 \\ 6 \end{pmatrix} \cdot X = \begin{pmatrix} -7 \\ 6 \end{pmatrix} \cdot \begin{pmatrix} 4 \\ 2 \end{pmatrix}$</p> <p>$-7x + 6y = -16$</p>
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Bsp. 13)

<p>a. $g: X = \begin{pmatrix} 3 \\ -1 \end{pmatrix} + t \cdot \begin{pmatrix} -3 \\ 9 \end{pmatrix}, H = (2 -1)$</p> <p>$\vec{n}_h = \text{Richtungsvektor von } g$</p> <p>$\Rightarrow \vec{n}_h = \begin{pmatrix} -3 \\ 9 \end{pmatrix}$</p> <p>$h: \begin{pmatrix} -3 \\ 9 \end{pmatrix} \cdot X = \begin{pmatrix} -3 \\ 9 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ -1 \end{pmatrix}$</p> <p>$-3x + 9y = -15$</p>	<p>b. $g: X = \begin{pmatrix} -2 \\ 2 \end{pmatrix} + t \cdot \begin{pmatrix} 4 \\ 5 \end{pmatrix}, H = (-1 7)$</p> <p>$\vec{n}_h = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$</p> <p>$h: \begin{pmatrix} 4 \\ 5 \end{pmatrix} \cdot X = \begin{pmatrix} 4 \\ 5 \end{pmatrix} \cdot \begin{pmatrix} -1 \\ 7 \end{pmatrix}$</p> <p>$4x + 5y = 31$</p>
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Bsp. 14)

<p>a. $g: X = \begin{pmatrix} 3 \\ -1 \end{pmatrix} + t \cdot \begin{pmatrix} -5 \\ 7 \end{pmatrix}$</p> <p>$\vec{RV}_g = \begin{pmatrix} -5 \\ 7 \end{pmatrix}$</p> <p>$\vec{n}_g = \begin{pmatrix} 7 \\ 5 \end{pmatrix}$</p>	<p>b. $g: 3x - 5y = 1$</p> <p>$\vec{n}_g = \begin{pmatrix} 3 \\ -5 \end{pmatrix}$</p> <p>$\vec{RV}_g = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$</p>
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Bsp. 15)

<p>a. $g: 2x + 4y = 10$</p> <p>$\hookrightarrow 2x = 10 - 4y \quad :2$</p> <p><u>$x = 5 - 2y$</u></p> <p>$y = 1 \Rightarrow x = 3 \quad P_1 = (3 1)$</p> <p>$y = 3 \Rightarrow x = -1 \quad P_2 = (-1 3)$</p> <p>$y = 10 \Rightarrow x = -15 \quad P_3 = (-15 10)$</p>	<p>b. $g: -3x - y = -4 \quad +3x$</p> <p>$-y = 3x - 4 \quad \cdot (-1)$</p> <p><u>$y = -3x + 4$</u></p> <p>$x = 1 \Rightarrow y = 1 \quad P_1 = (1 1)$</p> <p>$x = -2 \Rightarrow y = 10 \quad P_2 = (-2 10)$</p> <p>$x = 0 \Rightarrow y = 4 \quad P_3 = (0 4)$</p>
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Bsp. 16)

<p>a. $g: 3x - 2y = 10 \quad - \quad P_1 = (2 -2), P_2 = (-1 -3)$</p> <p><u>$P_1$</u>: $x = 2, y = -2$</p> <p>$3 \cdot 2 - 2 \cdot (-2) = 10$</p> <p>$6 + 4 = 10$</p> <p>$10 = 10 \checkmark$</p> <p>$P_1 \in g$</p> <p><u>$P_2$</u>: $3 \cdot (-1) - 2 \cdot (-3) = 10$</p> <p>$-3 + 6 = 10$</p> <p>$3 \neq 10$</p> <p>$P_2 \notin g$</p>	<p>b. $g: -5x + 4y = -1 \quad - \quad P_1 = (1 -1), P_2 = (1 1)$</p> <p><u>$P_1$</u>: $-5 + 4 \cdot (-1) = -1$</p> <p>$-5 - 4 = -9$</p> <p>$-9 \neq -1$</p> <p>$P_1 \notin g$</p> <p><u>P_2</u>: $-5 + 4 = -1$</p> <p>$-1 = -1$</p> <p>$P_2 \in g$</p>
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Bsp. 17)

<p>a. $g: 5x + y = 15$</p> <p>① $\vec{n}_g = \begin{pmatrix} 5 \\ 1 \end{pmatrix} \Rightarrow \vec{RV}_g = \begin{pmatrix} -1 \\ 5 \end{pmatrix}$</p> <p>② $P \in g: x = 3, y = 0 \quad P = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$</p> <p><u>$g: X = \begin{pmatrix} 3 \\ 0 \end{pmatrix} + t \cdot \begin{pmatrix} -1 \\ 5 \end{pmatrix}$</u></p>	<p>b. $g: -2x + 6y = 14$</p> <p>① $\vec{n}_g = \begin{pmatrix} -2 \\ 6 \end{pmatrix} \Rightarrow \vec{RV}_g = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$</p> <p>② $P \in g: x = -1, y = 2 \quad P = (-1 2)$</p> <p><u>$g: X = \begin{pmatrix} -1 \\ 2 \end{pmatrix} + t \cdot \begin{pmatrix} 6 \\ 2 \end{pmatrix}$</u></p>
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Bsp. 18)

<p>a. $g: X = \begin{pmatrix} -2 \\ 4 \end{pmatrix} + t \cdot \begin{pmatrix} -1 \\ -1 \end{pmatrix}$</p> <p>$\vec{n}_g = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$</p> <p>$\Rightarrow \underline{\underline{\begin{pmatrix} -1 \\ 1 \end{pmatrix} \cdot \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -1 \\ 1 \end{pmatrix} \cdot \begin{pmatrix} -2 \\ 4 \end{pmatrix}}}$</p> <p>$\underline{\underline{-x + y = 6}}$</p>	<p>b. $g: X = \begin{pmatrix} 9 \\ 2 \end{pmatrix} + t \cdot \begin{pmatrix} -6 \\ 2 \end{pmatrix}$</p> <p>$\vec{n}_g = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$</p> <p>$\Rightarrow \underline{\underline{\begin{pmatrix} 2 \\ 6 \end{pmatrix} \cdot \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ 6 \end{pmatrix} \cdot \begin{pmatrix} 9 \\ 2 \end{pmatrix}}}$</p> <p>$\underline{\underline{2x + 6y = 30}}$</p>
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Bsp. 19)

<p>a. $g: y = -2x + 7$</p> <p>① $k = -2 \Rightarrow \vec{r}_{V_g} = \begin{pmatrix} -1 \\ -2 \end{pmatrix}$</p> <p>② $P_{eg} = \begin{pmatrix} 0 \\ 7 \end{pmatrix}$</p> <p>$\underline{\underline{g: X = \begin{pmatrix} 0 \\ 7 \end{pmatrix} + t \cdot \begin{pmatrix} -1 \\ -2 \end{pmatrix}}}$</p>	<p>b. $g: y = 7x + 12$</p> <p>① $\vec{r}_{V_g} = \begin{pmatrix} 1 \\ 7 \end{pmatrix}$</p> <p>② $P_{eg} = \begin{pmatrix} 0 \\ 12 \end{pmatrix}$</p> <p>$\underline{\underline{g: X = \begin{pmatrix} 0 \\ 12 \end{pmatrix} + t \cdot \begin{pmatrix} 1 \\ 7 \end{pmatrix}}}$</p>
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Bsp. 20)

<p>a. $g: A = (-7 9), B = (-5 5)$</p> <p>① $\vec{AB} = \begin{pmatrix} 2 \\ -4 \end{pmatrix} \parallel \begin{pmatrix} -1 \\ 2 \end{pmatrix}$</p> <p>$\underline{\underline{g: X = \begin{pmatrix} -7 \\ 9 \end{pmatrix} + t \cdot \begin{pmatrix} -1 \\ 2 \end{pmatrix}}}$</p> <p>② $\vec{n}_g = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$</p> <p>$\underline{\underline{\begin{pmatrix} 2 \\ 1 \end{pmatrix} \cdot \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \end{pmatrix} \cdot \begin{pmatrix} -7 \\ 9 \end{pmatrix}}}$</p> <p>③ $\underline{\underline{2x + y = -5}}$</p> <p>④ $\underline{\underline{y = -2x - 5}}$</p>	<p>b. $g: A = (3 1), B = (10 -6)$</p> <p>① $\vec{AB} = \begin{pmatrix} 7 \\ -7 \end{pmatrix} \parallel \begin{pmatrix} 1 \\ -1 \end{pmatrix}$</p> <p>$\underline{\underline{g: X = \begin{pmatrix} 3 \\ 1 \end{pmatrix} + t \cdot \begin{pmatrix} 1 \\ -1 \end{pmatrix}}}$</p> <p>② $\vec{n}_g = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$</p> <p>$\underline{\underline{\begin{pmatrix} 1 \\ 1 \end{pmatrix} \cdot \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \cdot \begin{pmatrix} 3 \\ 1 \end{pmatrix}}}$</p> <p>③ $\underline{\underline{x + y = 4}}$</p> <p>④ $\underline{\underline{y = -x + 4}}$</p>
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Bsp. 21)

<p>a. $g: X = \begin{pmatrix} 2 \\ -4 \\ 2 \end{pmatrix} + t \cdot \begin{pmatrix} 4 \\ 1 \\ -1 \end{pmatrix} - P = (1 2 3)$</p> <p>$P: X = \begin{pmatrix} 1 \\ 3 \\ 1 \end{pmatrix} + u \cdot \begin{pmatrix} 4 \\ 1 \\ -1 \end{pmatrix}$</p> <p>NVzug: $\begin{pmatrix} 1 \\ -4 \\ 0 \end{pmatrix}$, da $\begin{pmatrix} 1 \\ -4 \\ 0 \end{pmatrix} \cdot \begin{pmatrix} 4 \\ 1 \\ -1 \end{pmatrix} = 4 - 4 = 0 \checkmark$</p> <p>$\Rightarrow N: X = \begin{pmatrix} 1 \\ 3 \\ 1 \end{pmatrix} + v \cdot \begin{pmatrix} 1 \\ -4 \\ 0 \end{pmatrix}$</p>	<p>b. $g: X = \begin{pmatrix} -3 \\ -6 \\ -1 \end{pmatrix} + t \cdot \begin{pmatrix} -2 \\ 3 \\ -6 \end{pmatrix} - P = (4 7 1)$</p> <p>$P: X = \begin{pmatrix} 4 \\ 7 \\ 1 \end{pmatrix} + u \cdot \begin{pmatrix} -2 \\ 3 \\ -6 \end{pmatrix}$</p> <p>NVzug: $\begin{pmatrix} 3 \\ -4 \\ -3 \end{pmatrix}$, da $\begin{pmatrix} 3 \\ -4 \\ -3 \end{pmatrix} \cdot \begin{pmatrix} -2 \\ 3 \\ -6 \end{pmatrix} = -6 - 12 + 18 = 0 \checkmark$</p> <p>$\Rightarrow N: X = \begin{pmatrix} 4 \\ 7 \\ 1 \end{pmatrix} + s \cdot \begin{pmatrix} 3 \\ -4 \\ -3 \end{pmatrix}$</p>
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Bsp. 22)

a) $T_1 = 0: X(0) = \begin{pmatrix} 0 \\ 7000 \\ 0 \end{pmatrix}$ $T_2 = 10: X(10) = \begin{pmatrix} 0 \\ 7000 \\ 0 \end{pmatrix} + \begin{pmatrix} 200 \\ 1000 \\ -200 \end{pmatrix} = \begin{pmatrix} 200 \\ 1000 \\ -200 \end{pmatrix}$

$T_3 = 30: X(30) = \begin{pmatrix} 6000 \\ 3000 \\ 1000 \end{pmatrix}$

b) $\left| \begin{pmatrix} 200 \\ 100 \\ -200 \end{pmatrix} \right| = \sqrt{200^2 + 100^2 + (-200)^2} = 300 \frac{m}{s} = 1080 \frac{km}{h}$

c) III $7000 - 200T = 0 \quad | +200T$ $X(35) = \begin{pmatrix} 7000 \\ 3500 \\ 0 \end{pmatrix}$
 $7000 = 200T \quad | :200$
 $T = 35 \text{ sek}$ ← LAMPUNG

Bsp. 23)

a) $T_1 = 0: X(0) = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$, $T_2 = 15: X(15) = \begin{pmatrix} 1200 \\ 1050 \\ 1500 \end{pmatrix}$, $X(50) = \begin{pmatrix} 4000 \\ 3500 \\ 5000 \end{pmatrix}$

b) $\left| \begin{pmatrix} 80 \\ 70 \\ 100 \end{pmatrix} \right| = \sqrt{80^2 + 70^2 + 100^2} \approx 145,95 \frac{m}{s} \approx 524,4 \frac{km}{h}$

c) III: $100t = 7000 \quad | :100$
 $T = 70 \text{ sek}$
 nach 70 Sekunden!