١

1-

d) π 1

2-

d) $-\frac{1}{2}$ 1

3-

$$\because \begin{vmatrix} 1 & x & x \\ x & 1 & x \\ x & x & 1 \end{vmatrix} = 0 \quad C_1 \to C_1 + C_2 + C_3$$

$$\therefore \begin{vmatrix} 2x+1 & x & x \\ 2x+1 & 1 & x \\ 2x+1 & x & 1 \end{vmatrix} = 0 \quad 1$$

$$\therefore (2x+1) \begin{vmatrix} 1 & x & x \\ 1 & 1 & x \\ 1 & x & 1 \end{vmatrix} = 0 \quad R_3 \to R_3 - R_1, \ R_2 \to R_2 - R_1 \quad \frac{1}{2}$$

$$\therefore (2x+1) \begin{vmatrix} 1 & x & x \\ 0 & 1-x & 0 \\ 0 & 0 & 1-x \end{vmatrix} = 0 \quad \frac{1}{2}$$

$$\therefore (2x+1)(1-x)^2 = 0 \quad \frac{1}{2}$$

$$\therefore x = -\frac{1}{2} \quad \text{Oder} \quad x = 1 \quad \frac{1}{2}$$

4-

$\because \frac{4}{1} \neq \frac{1}{-1} \neq \frac{3}{2}$ $\frac{1}{2}$

$\therefore$ sind die zwei Geraden nicht parallel

$\vec{r_1} = \vec{r_2}$ beim Schnittpunkt

$\therefore 3 + 4t_1 = t_2 \Rightarrow 4t_1 - t_2 = -3 \quad (1)$

$, -1 + t_1 = 4 - t_2 \Rightarrow t_1 + t_2 = 5 \quad (2)$

$, 2 + 3t_1 = -1 + 2t_2 \Rightarrow 3t_1 - 2t_2 = -3 \quad (3)$ $\frac{1}{2}$

Von (1), (2) $t_1 = \frac{2}{5}$, $t_2 = \frac{23}{5}$ $\frac{1}{2}$

Durch Ersetzen in der Gleichung (3)

$\therefore 3 \times \frac{2}{5} - 2 \times \frac{23}{5} = -8 \neq -3$

$\therefore$ erfüllen nicht diese Werte die Gleichung (3)

$\therefore$ sind die zwei Geraden windschief. $\frac{1}{2}$

3

(تراعى الحلول الأخرى)

5-

c) 1260 (1)

6-

a) $^{56}C_4$ (1)

7-

a) M $(1, -2, 0)$, $r = \sqrt{5}$ Einheit (1)

8-

(B) $\because (x-1)^6 - 9(x-1)^3 + 8 = 0$

$\therefore [(x-1)^3 - 1]\,[(x-1)^3 - 8] = 0$

$\therefore (x-1)^3 = 1$

$\therefore x - 1 = 1$

$\therefore x = 2$ $\left(\frac{1}{2}\right)$

Oder $x - 1 = w$

$\therefore x = 1 + w = -w^2$ $\left(\frac{1}{2}\right)$

Oder $x - 1 = w^2$

$\therefore x = 1 + w^2 = -w$ $\left(\frac{1}{2}\right)$

Oder

$(x-1)^3 = 8$

$\therefore x - 1 = 2$

$\therefore x = 3$ $\left(\frac{1}{2}\right)$

Oder $x - 1 = 2w$

$\therefore x = 1 + 2w$ $\left(\frac{1}{2}\right)$

Oder $x - 1 = 2w^2$

$\therefore x = 1 + 2w^2$ $\left(\frac{1}{2}\right)$

(3)

(A) $Z = \frac{8}{1+\sqrt{3}i} \times \frac{1-\sqrt{3}i}{1-\sqrt{3}i} = 2-2\sqrt{3}i$

$\therefore |Z| = \sqrt{4+12} = 4$ $\frac{1}{2}$

$, \theta = \tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3}$ $\frac{1}{2}$

$\therefore Z = 4\left[\cos\left(\frac{-\pi}{3}\right) + i\sin\left(\frac{-\pi}{3}\right)\right]$ $\frac{1}{2}$

$\therefore Z^{\frac{1}{2}} = 2\left[\cos\frac{-\frac{\pi}{3}+2m\pi}{2} + i\sin\frac{-\frac{\pi}{3}+2m\pi}{2}\right]$ $\frac{1}{2}$

$= 2\left[\cos\frac{-\pi+6m\pi}{6} + i\sin\frac{-\pi+6m\pi}{6}\right], m = 0,1$

bei $m = 0$

$\therefore Z^{\frac{1}{2}} = 2\left[\cos\left(\frac{-\pi}{6}\right) + i\sin\left(\frac{-\pi}{6}\right)\right] = 2e^{\frac{-\pi}{6}i}$ $\frac{1}{2}$

bei $m = 1$

$\therefore Z^{\frac{1}{2}} = 2\left[\cos\frac{5\pi}{6} + i\sin\frac{5\pi}{6}\right] = 2e^{\frac{5\pi}{6}i}$ $\frac{1}{2}$

3

(تراعى الحلول الأخرى)

9-

c) 2 1

10-

$\because \frac{x}{1}+\frac{y}{2}+\frac{z}{3}=1$ $\frac{1}{2}$

$\therefore 6x+3y+2z-6=0$ Die allgemeine Form $\frac{1}{2}$

$\because$ die Ebene durch den Punkt verläuft, $(1,0,0)$

$\therefore (6,3,2)\cdot\vec{r}=(6,3,2)\cdot(1,0,0)$

$\therefore (6,3,2)\cdot\vec{r}=6$ die vektorielle Form $\frac{1}{2}$

$, 6(x-1)+3y+2z=0$ die standardisierte Form $\frac{1}{2}$

2

11-

$$A = \begin{pmatrix} 2 & -4 & -9 \\ -1 & 2 & 3 \\ -3 & 6 & 9 \end{pmatrix}$$

$$\therefore |A| = 2(0) + 4(0) + 9(0) = 0 \quad \frac{1}{2}$$

$$, \because \begin{vmatrix} -4 & -9 \\ 2 & 3 \end{vmatrix} = 6 \neq 0 \quad \frac{1}{2}$$

$$\therefore RK(A) = 2 \quad \frac{1}{2}$$

$$\because A^* = \left(\begin{array}{ccc|c} 2 & -4 & -9 & 1 \\ -1 & 2 & 3 & 0 \\ -3 & 6 & 9 & -1 \end{array}\right)$$

$$, \because \begin{vmatrix} -4 & -9 & 1 \\ 2 & 3 & 0 \\ 6 & 9 & -1 \end{vmatrix}$$

$$= -4(-3) + 9(-2) + 1(0)$$

$$= -6 \neq 0 \quad \frac{1}{2}$$

$$\therefore RK(A^*) = 3$$

$$\therefore RK(A) \neq RK(A^*) \quad \frac{1}{2}$$

∴ hat das System keine Lösung. $\frac{1}{2}$

3

(تراعى الحلول الأخرى)

12-

a) 1 1

13-

d) 2 1

14-

c) 6 1

15-

$$T_{r+1} = {}^{15}C_r \left(\frac{1}{x}\right)^{15-r} (x^2)^r \quad \frac{1}{2}$$

$$= {}^{15}C_r \, x^{3r-15}$$

Setzen wir $3r - 15 = 0 \Rightarrow r = 5 \quad \frac{1}{2}$

T_6 ist frei von x

$\therefore T_6 = {}^{15}C_5 \quad \frac{1}{2}$

T_8 und T_9 sind die mittleren Terme

$\therefore \frac{T_9}{T_8} = 1 \Rightarrow \frac{15-8+1}{8} \cdot x^3 = 1 \quad 1$

$\therefore x = 1 \quad \frac{1}{2}$

3

(تراعى الحلول الأخرى)

16-

a) 1010 1

17-

a) 13 1

18-

b) $(-4, 0, 4)$ 1

19-

(B) $C_1(-1, 4, K)$, $r_1 = 5$
$C_2(3, 0, 3)$, $r_2 = 4$ $\frac{1}{2}$

$\therefore C_1C_2 = \sqrt{16 + 16 + (K-3)^2} = 9$ $\frac{1}{2}$

$\therefore (K-3)^2 = 49$

$\therefore K - 3 = 7$ Oder $K - 3 = -7$

$\therefore K = 10$ $\frac{1}{2}$ Oder $K = -4$ $\frac{1}{2}$

2

(A) $\overrightarrow{AB} = \vec{B} - \vec{A} = (1,0,0) - (0,0,1)$
$= (1,0,-1)$

$\overrightarrow{BC} = \vec{C} - \vec{B} = (0,1,0) - (1,0,0)$
$= (-1,1,0)$ $\frac{1}{2}$

$\therefore \overrightarrow{AB} \times \overrightarrow{BC} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 0 & -1 \\ -1 & 1 & 0 \end{vmatrix}$

$= \hat{i} + \hat{j} + \hat{k}$ $\frac{1}{2}$

$\therefore \vec{u} = \frac{\overrightarrow{AB} \times \overrightarrow{BC}}{\|\overrightarrow{AB} \times \overrightarrow{BC}\|}$

$= \pm \frac{(1,1,1)}{\sqrt{3}}$ $\frac{1}{2}$

$= \pm \left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$ $\frac{1}{2}$ 2

(تراعى الحلول الأخرى)

(انتهت الإجابة وتراعى الحلول الأخرى)