Problem Set. 1.4.

2.

$$C = \begin{bmatrix} a \end{bmatrix}$$

$$R = \begin{bmatrix} 1 & 1 & 1 \end{bmatrix}$$

3.

$$\begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ -1 & 1 & 0 \\ 1 & -1 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$$

5.

$$\begin{bmatrix} \quad \end{bmatrix}$$

column space. $\mathbb{R}^4$.

$\Rightarrow$ at most 4 independent columns $\boxed{\text{是否循环论证?}}$

$$\underbrace{\begin{bmatrix} x_1 & x_2 & x_3 & x_4 \\ y_1 & y_2 & y_3 & y_4 \\ z_1 & z_2 & z_3 & z_4 \\ w_1 & w_2 & w_3 & w_4 \end{bmatrix}}_{\text{independent}} = A$$

~~If~~ then. there must be a solution to

$A \cancel{a_5} x = a_5 \Rightarrow a_5$ can't be independent

亦或用方程消元的角度解释

7.

$$C = \begin{bmatrix} 2 & 1 & 0 \\ 1 & 0 & 0 \\ 3 & 0 & 1 \end{bmatrix}$$

$$R = \begin{bmatrix} 1 & -1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 2 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

11.

$$\begin{bmatrix} 1 & 0 & 1 & 2 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} = \underbrace{\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}}_{C} \underbrace{\begin{bmatrix} 1 & 0 & 1 & 2 \\ 0 & 1 & 1 & 1 \end{bmatrix}}_{R}$$

13

$$CR = \begin{bmatrix} 2 & 4 \\ 6 & 12 \end{bmatrix}$$

2
6

$$RC = \begin{bmatrix} 14 \end{bmatrix}$$

$$CRC = \begin{bmatrix} 14 \\ 42 \end{bmatrix}$$

$$RCR = \begin{bmatrix} 28 & 56 \end{bmatrix}$$

17.

(a). $\begin{bmatrix} a & ma. & na \end{bmatrix} \begin{bmatrix} b. & xb. & yb \end{bmatrix}$

$= \begin{bmatrix} \text{com of } a. & \text{comb of } a & \text{comb of } a \end{bmatrix}$

$\Rightarrow$ always rank. 1 $\boxed{\text{True}}$

(b) $\begin{bmatrix} a. & b & c \end{bmatrix} \begin{bmatrix} x_1 & y_1 & z_1 \\ x_2, & y_2. & z_2 \\ x_3 & y_3 & z_3 \end{bmatrix}$

~~False~~ $\begin{bmatrix} ax_1+bx_2+cx_3, & ay_1+by_2+cy_3, & az_1+bz_2+cz_3 \end{bmatrix}$

First. a.b.c are independent

$\Rightarrow ax_1+bx_2+cx_3 \neq k(ay_1+by_2+cy_3)$ or. $x, y$. be dependent

$\Rightarrow k_1(ax_1+bx_2+cx_3) + k_2(ay_1+by_2+cy_3) = az_1+bz_2+cz_3$

$k_1x_1+k_2y_1 = z_1$. $x, y, z$ be dependent

$\Rightarrow \boxed{\text{True}}$

(c) $\begin{bmatrix} x_1 & x_2 \\ y_1 & y_2 \end{bmatrix}\begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}\begin{bmatrix} x_1 & x_2 \\ y_1 & y_2 \end{bmatrix}$

$\Rightarrow$ for every $a, b, c, d$

$x_1 a + x_2 c = x_1 a + y_1 b \Rightarrow x_2 c = y_1 b \Rightarrow x_2 = y_1 = 0.$

$x_1 b + x_2 d = a x_2 + b y_2 \Rightarrow x_1 = y_2.$

$\boxed{\text{True}}$

19.

$$AB = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}\begin{bmatrix} 1 & 1 & 1 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}\begin{bmatrix} 0 & 1 & 1 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}\begin{bmatrix} 0 & 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix} + \begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{bmatrix} + \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 2 \\ 1 & 2 & 3 \end{bmatrix}$$

$$BA = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}\begin{bmatrix} 1 & 0 & 0 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}\begin{bmatrix} 1 & 1 & 0 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}\begin{bmatrix} 1 & 1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 2 \\ 1 & 2 & 3 \end{bmatrix}$$

HW:2-补充

1.

(1) $$\begin{bmatrix}\cos\varphi & -\sin\varphi \\ \sin\varphi & \cos\varphi\end{bmatrix}\begin{bmatrix}\cos\varphi & -\sin\varphi \\ \sin\varphi & \cos\varphi\end{bmatrix}$$

$$=\begin{bmatrix}\cos^2\varphi-\sin^2\varphi & -2\sin\varphi\cos\varphi \\ 2\cos\varphi\sin\varphi & -\sin^2\varphi+\cos^2\varphi\end{bmatrix}$$

$$=\begin{bmatrix}\cos 2\varphi & -\sin 2\varphi \\ \sin 2\varphi & \cos 2\varphi\end{bmatrix}$$

归纳可知

$$\begin{bmatrix}\cos\varphi & -\sin\varphi \\ \sin\varphi & \cos\varphi\end{bmatrix}^n=\begin{bmatrix}\cos n\varphi & -\sin n\varphi \\ \sin n\varphi & \cos n\varphi\end{bmatrix}$$

2.

(2)

$$\begin{bmatrix}0&1&0&0\\0&0&1&0\\0&0&0&1\\0&0&0&0\end{bmatrix}\begin{bmatrix}0&1&0&0\\0&0&1&0\\0&0&0&1\\0&0&0&0\end{bmatrix}=\begin{bmatrix}0&0&1&0\\0&0&0&1\\0&0&0&0\\0&0&0&0\end{bmatrix}$$

相当于平移到

故 $$\begin{bmatrix}0&1&0&0\\0&0&1&0\\0&0&0&1\\0&0&0&0\end{bmatrix}^3=\begin{bmatrix}0&0&0&1\\0&0&0&0\\0&0&0&0\\0&0&0&0\end{bmatrix}$$

(3)

$$\begin{bmatrix} \lambda & 1 & 0 & 0 \\ 0 & \lambda & 1 & 0 \\ 0 & 0 & \lambda & 1 \\ 0 & 0 & 0 & \lambda \end{bmatrix}^n = \begin{bmatrix} \begin{bmatrix}\lambda & 1 \\ 0 & \lambda\end{bmatrix}\begin{bmatrix}\lambda & 1 \\ 0 & \lambda\end{bmatrix} + 0 & \begin{bmatrix}\lambda & 1 \\ 0 & \lambda\end{bmatrix}\begin{bmatrix}0 & 0 \\ 1 & 0\end{bmatrix} + \begin{bmatrix}0 & 0 \\ 1 & 0\end{bmatrix}\begin{bmatrix}\lambda & 1 \\ 0 & \lambda\end{bmatrix} \\ 0 & 0 + \begin{bmatrix}\lambda & 1 \\ 0 & \lambda\end{bmatrix}^2 \end{bmatrix}$$

$\Rightarrow$ 归纳到n次方.

$$\begin{bmatrix} A & B \\ 0 & A \end{bmatrix}\begin{bmatrix} \begin{bmatrix}\lambda & 1 \\ 0 & \lambda\end{bmatrix} & \begin{matrix}0 & 0 \\ 1 & 0\end{matrix} \\ 0 & \begin{matrix}\lambda & 1 \\ 0 & \lambda\end{matrix} \end{bmatrix} = \begin{bmatrix} \begin{bmatrix}\lambda & 1 \\ 0 & \lambda\end{bmatrix}^n & \\ 0 & \begin{bmatrix}\lambda & 1 \\ 0 & \lambda\end{bmatrix}^n \end{bmatrix}$$

$$= \begin{bmatrix} \lambda^n & n\lambda^{n-1} & \cancel{A A^{n-2}} \\ 0 & \lambda^n & n\lambda^{n-1} \\ & & \end{bmatrix}$$

$$\cancel{A}\begin{bmatrix} \lambda^n & n\lambda^{n-1} \\ 0 & \lambda^n \end{bmatrix}\begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix} = \begin{bmatrix} n\lambda^{n-1} & 0 \\ \lambda^n & 0 \end{bmatrix}$$

$$B_{n-1}\begin{bmatrix} \lambda & 1 \\ 0 & \lambda \end{bmatrix} + \begin{bmatrix} n\lambda^{n-1} & 0 \\ \lambda^n & 0 \end{bmatrix} = B_n$$

$$\begin{bmatrix} \lambda & 1 & 0 & 0 \\ & & & \\ & & & \end{bmatrix}$$

$$= \begin{bmatrix} \lambda^n & n\lambda^{n-1} & \frac{n(n+1)}{2}\lambda^{n-2} & \frac{n(n-1)(n-2)}{6}\lambda^{n-3} \\ 0 & \lambda^n & n\lambda^{n-1} & \frac{n(n+1)}{2}\lambda^{n-2} \\ 0 & 0 & \lambda^n & n\lambda^{n-1} \\ 0 & 0 & 0 & \lambda^n \end{bmatrix}$$

(3) $n=0$ 无意义

method $\begin{bmatrix} \lambda & 1 & 0 & \\ 0 & \lambda & 1 & \\ 0 & 0 & \lambda & 1 \\ 0 & 0 & 0 & \lambda \end{bmatrix}^n = \begin{bmatrix} \begin{bmatrix} \lambda & 1 \\ 0 & \lambda \end{bmatrix}^n & b \\ 0 & \begin{bmatrix} \lambda & 1 \\ 0 & \lambda \end{bmatrix}^n \end{bmatrix}$ b可以硬解.

见上页.

$$\begin{bmatrix} \lambda & 1 & 0 & 0 \\ 0 & \lambda & 1 & 0 \\ 0 & 0 & \lambda & 1 \\ 0 & 0 & 0 & \lambda \end{bmatrix} = \left( \begin{bmatrix} \lambda & 0 & 0 & 0 \\ 0 & \lambda & 0 & 0 \\ 0 & 0 & \lambda & 0 \\ 0 & 0 & 0 & \lambda \end{bmatrix} + \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix} \right)^n$$

$$= \begin{bmatrix} \lambda^n & & 0 & 0 \\ & \ddots & 0 & 0 \\ & & & 0 \\ 0 & & & \lambda^n \end{bmatrix} + C_n^1 \begin{bmatrix} \lambda & & 0 \\ 0 & \lambda & \\ 0 & & \lambda \\ & & & \lambda \end{bmatrix} [$$

由(2) $\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}^4 = 0$

$$\Rightarrow \begin{bmatrix} \lambda^n & & \\ & \ddots & \\ & & \lambda^n \end{bmatrix} + n \cdot \begin{bmatrix} 0 & \lambda^{n-1} & 0 & 0 \\ 0 & 0 & \lambda^{n-1} & 0 \\ 0 & 0 & 0 & \lambda^{n-1} \\ 0 & 0 & 0 & 0 \end{bmatrix} + \frac{n(n-1)}{2} \begin{bmatrix} & & \lambda^{n-2} & 0 \\ & & & \lambda^{n-2} \\ 0 & & & \end{bmatrix}$$

$$+ \frac{n(n-1)(n-2)}{6} \begin{bmatrix} & & & \lambda^{n-3} \\ & 0 & & \end{bmatrix}$$

与前页相同

(4) $\begin{bmatrix} 1 & \alpha & \beta \\ 0 & 1 & \alpha \\ 0 & 0 & 1 \end{bmatrix}^n$.

$$\begin{bmatrix} 0 & 0 & \beta \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}^2 = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 0 & \beta \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}\begin{bmatrix} 0 & \alpha & 0 \\ 0 & 0 & \alpha \\ 0 & 0 & 0 \end{bmatrix} =$$

$$\begin{bmatrix} 0 & \alpha & 0 \\ 0 & 0 & \alpha \\ 0 & 0 & 0 \end{bmatrix}\begin{bmatrix} 0 & 0 & \beta \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} =$$

$$\begin{bmatrix} 0 & \alpha & 0 \\ 0 & 0 & \alpha \\ 0 & 0 & 0 \end{bmatrix}^3 = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & \alpha & \beta \\ 0 & 1 & \alpha \\ 0 & 0 & 1 \end{bmatrix}^n = \left( \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} + \begin{bmatrix} 0 & \alpha & 0 \\ 0 & 0 & \alpha \\ 0 & 0 & 0 \end{bmatrix} + \begin{bmatrix} 0 & 0 & \beta \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} \right.$$

$$= \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} + \cancel{C_n^1 \cdot C_n^1 \begin{bmatrix} 0 & \alpha & 0 \\ 0 & 0 & \alpha \\ 0 & 0 & 0 \end{bmatrix}} \; C_n^1 \cdot \begin{bmatrix} 0 & \alpha & 0 \\ 0 & 0 & \alpha \\ 0 & 0 & 0 \end{bmatrix}$$

$$+ C_n^1 \begin{bmatrix} 0 & 0 & \beta \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} + C_n^2 \begin{bmatrix} 0 & 0 & \alpha \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & n\alpha & n\beta + \frac{n(n-1)}{2}\alpha \\ 0 & 1 & n\alpha \\ 0 & 0 & 1 \end{bmatrix}$$

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2. $\begin{bmatrix} \lambda_1 & & & 0 \\ & \lambda_2 & & \\ & & \ddots & \\ 0 & & & \lambda_n \end{bmatrix} \begin{bmatrix} & & \\ \boxed{a}_{21} & & \\ & & \end{bmatrix}$

$= \begin{bmatrix} \lambda_1 \cdot \text{row} 1 \\ \vdots \\ \lambda_n \text{ row} n \end{bmatrix}$

$\begin{bmatrix} & & \\ & & \end{bmatrix} \begin{bmatrix} \lambda_1 & & \\ & \ddots & \\ & & \lambda_n \end{bmatrix} = \begin{bmatrix} \lambda_1 \cdot \text{col} 1 & \cdots & \lambda_n \text{col} n \\ & & \end{bmatrix}$

$\Rightarrow$ if the two are the same

$\lambda_2 \cdot a_{21} = \lambda_1 \cdot a_{21}$. $\lambda_2 \neq \lambda_1 \Rightarrow a_{21} = 0$

same method $\Rightarrow$ diagonal

3. $\begin{bmatrix} a & b \\ c & d \end{bmatrix}^2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$\Rightarrow A = A^{-1}$

$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix}$

$a^2 + bc = 1.$

$ab + bd = 0$ $\quad b(a+d) = 0$ $\quad b=0$ 或 $a = -d$

$cd + ac = 0$ $\quad c(a+d) = 0$ $\quad c=0$ 或 $a = -d$

$\cancel{cd}\ cb + d^2 = 1$

$a \neq -d$ 时

① $\begin{bmatrix} -1 & 0 \\ a & 1 \end{bmatrix}$ $\begin{bmatrix} 1 & 0 \\ a & -1 \end{bmatrix}$ $\begin{bmatrix} 1 & b \\ 0 & -1 \end{bmatrix}$ $\begin{bmatrix} -1 & b \\ 0 & 1 \end{bmatrix}$

specially $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$

~~$a \neq -d$ 时~~ $a=-d$ 时

② $\begin{bmatrix} a & b \\ \frac{1-a^2}{b} & -a \end{bmatrix}$

两种情况其实存在重叠

~~$\begin{bmatrix} a & \\ & a \end{bmatrix}$~~

# Chapter 2.

Prob. Set 2.1

6. $b=4$.

$g=32$.

$x=0$. $y=4$

or. $x=2$. $y=3$

7.

(1) permontly : $a=2$

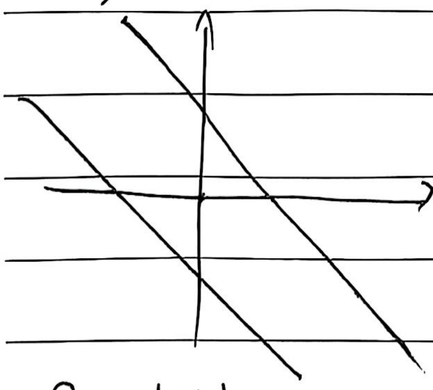
(2) temporarily $a=0$

$\begin{cases} x=3 \\ y=-1 \end{cases}$

8. $k=3.\ -3.\ 0$

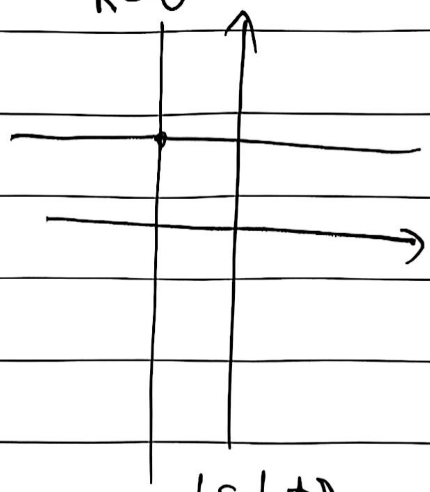
~~fix~~ fixed.

$k=3$



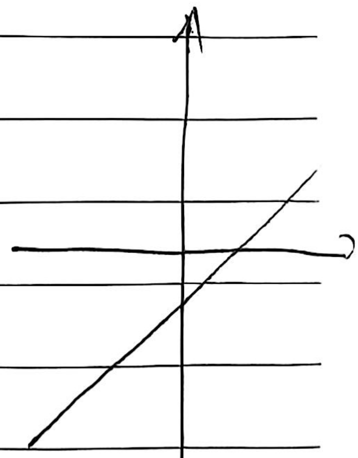
0 solution

$k=0$



1 solution

$k=-3$



$\infty$ solution

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(11) $\frac{x+X}{2}$  $\frac{y+Y}{2}$ . $\frac{z+Z}{2}$

(12) on the line through the two points.

12.

$$\begin{bmatrix} 2 & 3 & 1 \\ 4 & 7 & 5 \\ 0 & -2 & 2 \end{bmatrix} \longrightarrow \begin{bmatrix} 2 & 3 & 1 \\ 0 & 1 & 3 \\ 0 & -2 & 2 \end{bmatrix} \longrightarrow \begin{bmatrix} 2 & 3 & 1 \\ 0 & 1 & 3 \\ 0 & 0 & 8 \end{bmatrix}$$

$$\begin{bmatrix} 8 \\ 20 \\ 0 \end{bmatrix} \qquad \begin{bmatrix} 8 \\ 4 \\ 0 \end{bmatrix} \qquad \begin{bmatrix} 8 \\ 4 \\ 8 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -3 & 0 \\ 4 & -5 & 1 \\ 2 & -1 & -3 \end{bmatrix} \longrightarrow \begin{bmatrix} 2 & -3 & 0 \\ 0. & 1 & 1 \\ 0 & 2 & -3 \end{bmatrix} \longrightarrow \begin{bmatrix} 2 & -3 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & -5 \end{bmatrix}$$

$$\begin{bmatrix} 3 \\ 7 \\ 5 \end{bmatrix} \longrightarrow \begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix} \longrightarrow \begin{bmatrix} 3 \\ 1 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 1 \\ 0. \end{bmatrix}$$

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$g=-4$. $t=\cancel{4}5$

$$\begin{bmatrix} 1 & 4 & -2 \\ 0 & 3 & -4 \\ 0 & 3 & -4 \end{bmatrix}$$

$\cancel{z=1}$

$\cancel{y=\frac{10}{3}}$

$\cancel{x=\frac{-31}{3}}$

$3\frac{40}{3}$

$z=1$

$y=3$

$x=-9$

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Problem set 2.2

12. $P^{-1} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ $P^{-1} = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$

13

$10x+20y=1$ $10y=-2$

$20x+50y=0$ $y=-\frac{1}{5}$ $x=\frac{1}{2}$

~~$10x+20$~~

$\begin{cases} 10t+20z=0 \\ 20t+50z=1 \end{cases}$ $10z=1$

$z=\frac{1}{10}$ $x=-\frac{1}{5}$

15.

(1) $A^{-1}AB=A^{-1}AC \Rightarrow B=C$

(2) $B=\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ $C=\begin{bmatrix} 2 & 2 \\ 0 & 0 \end{bmatrix}$

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$C=AB$

$C^{-1}=B^{-1}A^{-1}$

$\Rightarrow BC^{-1}=A^{-1}$

26.
$$A^{-1}\cdot A^{-1} = B.$$
$$AB = A\cdot A^{-1}A^{-1} = A^{-1}$$

28.
$$\begin{bmatrix}1&1\\1&1\end{bmatrix} \times \quad \begin{bmatrix}0&0\\0&0\end{bmatrix} \times \quad \begin{bmatrix}1&1\\0&0\end{bmatrix} \times \quad \begin{bmatrix}0&0\\1&1\end{bmatrix} \times$$

12 are invertible

31.
$$\left[\begin{array}{ccc|ccc}2&1&1&1&0&0\\1&2&1&0&1&0\\1&1&2&0&0&1\end{array}\right]$$

$$\left[\begin{array}{ccc|ccc}2&1&1&1&0&0\\0&\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&1&0\\0&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&0&1\end{array}\right] \Rightarrow \text{逆矩阵} \begin{bmatrix}\frac{3}{4}&-\frac{1}{4}&-\frac{1}{4}\\-\frac{1}{4}&\frac{3}{4}&-\frac{1}{4}\\-\frac{1}{4}&-\frac{1}{4}&\frac{3}{4}\end{bmatrix}$$

$$\begin{bmatrix}2&1&1\\0&\frac{3}{2}&\frac{1}{2}\\0&&\end{bmatrix}$$

$$\left[\begin{array}{ccc}\cancel{1}&\cancel{1}&\cancel{2}\\\cancel{1}&\cancel{2}&\cancel{1}\\1&1&2\end{array}\right]\left[\begin{array}{ccc}\cancel{0}&\cancel{0}&\cancel{1}\\\cancel{0}&\cancel{1}&\cancel{0}\\1&0&0\end{array}\right]$$

~~同理. $B^{-1}$~~

$B^{-1}$ 不存在. $-\text{col}1 - \text{col}3 = \text{col}2$

不独立

32. $\left[\begin{array}{ccc|ccc} 1 & a & b & 1 & 0 & 0 \\ 0 & 1 & c & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array}\right]$ $U^{-1} = \begin{bmatrix} 1 & -a & -b \\ 0 & 1 & -c \\ 0 & 0 & 1 \end{bmatrix}$

34. $\begin{bmatrix} a & b & b \\ 0 & a-b & 0 \\ 0 & a-b & a-b \end{bmatrix} \Rightarrow \begin{bmatrix} a & b & b \\ 0 & a-b & 0 \\ 0 & 0 & a-b \end{bmatrix}$

U 对角线无 0. 可逆.

$c = 7, 2, 0$ 4 ~~6~~

36. $\left[ \right.$

$\Rightarrow$. $Px = Qx$. P. Q 是对行进行调换,

$P=Q$ 时. $P-Q$ 全 0. 不可逆.

除此之外. $(P-Q)x=0$ 无非零解. $\Rightarrow$ 不存在逆

3].

$$\left[\begin{array}{cc|cc} I & 0 & I & 0 \\ C & I & 0 & I \end{array}\right] \downarrow \left[\begin{array}{cc|cc} I & 0 & I & 0 \\ 0 & I & -C & I \end{array}\right]$$

$$\left[\begin{array}{cc|cc} A & 0 & I & 0 \\ C & D & 0 & I \end{array}\right] \xrightarrow{-CA^{-1}} \left[\begin{array}{cc|cc} A & 0 & I & 0 \\ 0 & D & -CA^{-1} & I \end{array}\right] \downarrow \left[\begin{array}{cc|cc} I & 0 & A^{-1} & 0 \\ 0 & I & -D^{-1}CA^{-1} & D^{-1} \end{array}\right]$$

$$\left[\begin{array}{cc|cc} 0 & I & I & 0 \\ I & D & 0 & I \end{array}\right] \quad \left[\begin{array}{cc|cc} I & D & 0 & I \\ 0 & I & I & 0 \end{array}\right] \quad \left[\begin{array}{cc|cc} I & 0 & -D & I \\ 0 & I & I & 0 \end{array}\right]$$