2b

$$\begin{bmatrix} 1 & -5 & 3 & -1 \\ \boxed{3} & -1 & 2 & 4 \\ \boxed{2} & \boxed{1} & -1 & 2 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & -5 & 3 & -1 \\ 0 & 14 & -7 & 7 \\ 0 & 11 & -7 & 4 \end{bmatrix}$$

$-3R_1 \quad -3 \quad 15 \quad -9 \quad 3$

$-2R_1 \quad -2 \quad 10 \quad -6 \quad 2$

$$\rightarrow \begin{bmatrix} 1 & -5 & 3 & -1 \\ 0 & 2 & -1 & 1 \\ 0 & \boxed{11} & -7 & 4 \end{bmatrix} \begin{matrix} \\ \times 11 \\ \times -2 \end{matrix} \rightarrow \begin{bmatrix} 1 & -5 & 3 & -1 \\ 0 & 22 & -11 & 11 \\ 0 & -22 & 14 & -8 \end{bmatrix}$$

$$\rightarrow \begin{bmatrix} 1 & -5 & 3 & -1 \\ 0 & 2 & -1 & 1 \\ 0 & 0 & 3 & 3 \end{bmatrix} \rightarrow \boxed{z = 1}$$

$2y - 1 = 1$

$\boxed{y = 1}$

$x - 5 + 3 = -1$

$\boxed{x = 1}$

#26

$$3x^2-2x+1+\frac{2x+3}{x^2+2x+3}$$

$$x^2+2x+3 \overline{)\, \cancel{3x^4}+4x^3+6x^2-2x+6}$$

$$-\cancel{3x^4}-6x^3-9x^2$$

$$-\cancel{2x^3}-3x^2-2x$$

$$+\cancel{2x^3}+4x^2+6x$$

$$\cancel{x^2}+4x+6$$

$$-\cancel{x^2}-2x-3$$

degree 1 $\boxed{2x+3}$

$$2\tfrac{5}{6}$$

$$6\overline{)\,17}$$

$6\left(2\tfrac{5}{6}\right)$

$=12+5$

$=17$

$$x^4-x^3+x-1+\frac{x}{x^2+x+1}$$

$$x^2+x+1\overline{)\,x^6 \_\ \_\ \_\ \_ +x-1}$$

$$-x^6-x^5-x^4$$

$$-\cancel{x^5}-\cancel{x^4}$$

$$+\cancel{x^5}+\cancel{x^4}+x^3$$

$$\cancel{x^3}+x$$

$$-\cancel{x^3}-x^2-x$$

$$-x^2-1$$

$$14\tfrac{4}{5}$$

$$5\overline{)\,74}$$

5

24

20

4

$$-\cancel{x^2}-x$$

$$+\cancel{x^2}+x+1$$

$$x$$

Ex.
$$\begin{cases} 3x - 2y + z = -5 \\ 4x + 6y - 2z = 24 \\ 6x + 9y - 3z = 36 \end{cases}$$

$$D = \det \begin{pmatrix} 3 & -2 & 1 \\ 4 & 6 & -2 \\ 6 & 9 & -3 \end{pmatrix} = 0$$

Try Gaussian Elimination

$$\begin{array}{r} -4 \\ 3 \\ \\ \end{array}\begin{bmatrix} 3 & -2 & 1 & -5 \\ \textcircled{4} & 6 & -2 & 24 \\ 6 & 9 & -3 & 36 \end{bmatrix} \rightarrow \begin{bmatrix} -12 & 8 & -4 & 20 \\ 12 & 18 & -6 & 72 \\ 6 & 9 & -3 & 36 \end{bmatrix}$$

$-2R_1 \quad -6 \quad 4 \quad -2 \quad 10$

$$\rightarrow \begin{bmatrix} 3 & -2 & 1 & -5 \\ 0 & 26 & -10 & 92 \\ 0 & 13 & -5 & 46 \end{bmatrix} \rightarrow \begin{bmatrix} 3 & -2 & 1 & -5 \\ 0 & 13 & -5 & 46 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

$-13 \quad 5 \quad -46$

$$\begin{bmatrix} 3 & -2 & 1 & -5 \\ 0 & 13 & -5 & 46 \\ 0 & 0 & 0 & 0 \end{bmatrix} \rightarrow \quad 13y - 5z = 46$$

$$z = \frac{46 - 13y}{-5}$$

$$\boxed{z = \frac{13y - 46}{5}}$$

$$3x - 2y + z = -5$$

$$3x + 2y + \left(\frac{13}{5}y - \frac{46}{5}\right) = -5$$

$$\frac{-25}{5} + \frac{46}{5}$$

$$3x + \frac{23}{5}y = \frac{21}{5}$$

$$3x = \frac{21}{5} - \frac{23}{6}y$$

$$\boxed{x = \frac{21}{15} - \frac{23}{15}y}$$

Solution: $\boxed{\left(\frac{21}{15} - \frac{23}{15}y,\ y,\ \frac{13}{5}y - \frac{46}{5}\right)}$

There

Ex. $\begin{cases} 3x + y + z = 1 \\ 2x - y - 2z = 3 \\ x + 2y + kz = 5 \end{cases}$

(a) Is there a value of k for which the system has a unique solution?

$(-3k - 2 + 4) - (-1 - 12 + 2k)$

$$D = \begin{pmatrix} 3 & 1 & 1 \\ 2 & -1 & -2 \\ 1 & 2 & k \end{pmatrix} \begin{matrix} 3 & 1 \\ 2 & -1 \\ 1 & 2 \end{matrix} = -5k + 15$$

$-5k + 15 \neq 0$

$k \neq 3$

$$\boxed{\{k \mid k \neq 3\}}$$

$k = 3 \Rightarrow$ either no solution or infinitely many

#1d range

$(-\infty, -0.25] \cup (0, \infty)$

#2 $f(g(\underline{h(3)})) = f(\underline{g(4)}) = f(2) = \underline{3}$

$h^{-1}(g^{-1}(f^{-1}(3))) = 3$

f	f^{-1}
$(2, 3)$	$(3, 2)$

$f^{-1}(3) = 2$

$\boxed{\#3}$ $(f \circ f)(x) = f(f(x))$

$$= f\left(\frac{1}{x-1}\right) = \frac{1}{\frac{1}{x-1} - 1} = \frac{1}{\frac{1}{x-1} - \frac{x-1}{x-1}}$$

$$= \frac{1}{\frac{2-x}{x-1}} = \boxed{\frac{x-1}{2-x}}$$

$\frac{3-1}{2-3} = \frac{2}{-1}$

check

~~$f(f(2))$~~

~~$f\left(\frac{1}{2-1}\right) = f(1)$~~

$f(f(3))$

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

$= \frac{1}{\frac{1}{2} - 1} = -2$

inverse: $x = \frac{y-1}{2-y}$

$2x - xy = y - 1$

$+xy + y = +2x + 1$

$y(x+1) = 2x + 1$

$(f \circ f)^{-1}(x) = \frac{2x+1}{x+1}$

HW Review

book ↓

#4, 5a–d, 6,

⚄ #5

chapter $\boxed{3R}$ #2c Gauss