

6.2
100

i) simplify

i) $2x + 4y - 5z - 5x - 9y + 2z + 4x - 7y + 8z$

~~8x - 12y + 5z~~ $x - 12y + 5z$ (5)

ii) $x(x+2) - (x-4)$

$x^2 + 2x - (x-4)$ (0)

iii) $3p^2qr \times 4pq^3 \times 5qr^2$

$60p^3q^5r^3$ (5)

iv) $\frac{6p^2q^3r}{3p^3q^3r^{-2}} = 2p^{-1}q^0r^{-2}$

v) $\frac{2fg}{16h} \times \frac{4gh^2}{4fh} \times \frac{32fh^3}{12f^3}$

~~$\frac{2 \times 32 f^8 h^8 g^4}{32 f^8 h^8 g^4} \times \frac{64 h^3 g^4}{64 h^3 g^4} \times \frac{2048}{2048}$~~

$\frac{2}{16} fg \times gh^2 \times \frac{8}{3} fh$

$\frac{2}{16} g \times gh \times \frac{8}{3} h$

$\frac{2}{16} g^2 \frac{8}{3} h^2$ (0)

Q2 solve linear

i) $5(x-3) = 2(x+6)$

$$5x - 15 = 2x + 12$$

$$5x = 2x + 27$$

$$3x = 27$$

$$x = 27/3 = 9$$

10

ii) $\frac{x+6}{2} = x + \frac{(2x-5)}{3}$

$$x+6 = 2x + \frac{4x-10}{3}$$

$$-x = \frac{4x-10}{3} - 6$$

$$-x = \frac{4x-10-18}{3}$$

$$3(-x+6) = 4x-10$$

$$-3x+18 = 4x-10$$

$$7x = 28$$

$$x = \frac{28}{7}$$

$$x = 28/7 = 4$$

10

3) solve

① $2x+4y=16$

② $3x+2y=7$

$$3(-\frac{1}{2}) + 2y = 7$$

$$2y = 8.5 = \frac{17}{2}$$

$$y = 17/4 = 4.25$$

$$③ = 2② = 6x+4y=14$$

$$① \leftarrow 4y = 14 - 6x$$

$$2x + (14 - 6x) = 16$$

$$-4x + 14 = 16$$

$$-4x = 2$$

$$② \leftarrow x = -\frac{1}{2}$$

10

4) find determinant and inverse A^{-1} of matrix

$$A = \begin{bmatrix} 1 & 1 & 6 \\ 1 & 2 & 2 \\ 1 & 3 & -1 \end{bmatrix}$$

$$\begin{aligned} &= 1((2 \times -1) - (2 \times 3)) - 1((1 \times -1) - (2 \times 1)) + 6((1 \times 3) - (2 \times 1)) \\ &= 1(-2 - 6) - 1(-1 - 2) + 6(3 - 2) \\ &= 1(-8) - 1(-3) + 6(1) \\ &= -8 + 3 + 6 \\ &= 1 \end{aligned}$$

2

$$\begin{aligned} A^{-1} &= \frac{1}{\det A} \begin{bmatrix} -1 & -2 & 6 \\ -3 & 2 & -1 \\ 1 & -1 & 1 \end{bmatrix} \\ &= \frac{1}{1} \begin{bmatrix} -1 & -2 & 6 \\ -3 & 2 & -1 \\ 1 & -1 & 1 \end{bmatrix} \end{aligned}$$

5)

Simultaneous equations represent matrix equation

$AX = k$ where A is a matrix of $\mathbb{Q}_4$

$$X = \begin{bmatrix} x & y & z \end{bmatrix}^T = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

$$k = \begin{bmatrix} 1 & 2 & 4 \end{bmatrix}^T = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 6 \\ 1 & 2 & 2 \\ 1 & 3 & -1 \end{bmatrix} \begin{bmatrix} x & y & z \end{bmatrix}^T = \begin{bmatrix} 1 & 2 & 4 \end{bmatrix}^T$$

$$\begin{bmatrix} 1 & 1 & 6 \\ 1 & 2 & 2 \\ 1 & 3 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$$

① $1x + 1y + 6z = 1$

② $1x + 2y + 2z = 2$

③ $1x + 3y - 1z = 4$

2x

0

④ $② + 2③ = 3x + 8y = 10$

$② + ⑥ = 1x + 8z = -6$

⑤ $① \times 3 \rightarrow 3x = 10 - 8y$

$x = -6 - 8z$

$8z = -6 - x$

$z = \frac{-6 - x}{8}$

$x + -6 - x = -6$

$-6 = -6$

⑥ $② \times 3 = 10 - 8y + 6y + 6z = 6$

$z =$

$y =$

$x =$

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$$\textcircled{1} \quad 1x + 1y + 6z = 1$$

$$\textcircled{2} \quad 1x + 2y + 2z = 2$$

$$\textcircled{3} \quad 1x + 3y - 1z = 4$$

$$\begin{bmatrix} 1 & 1 & 6 \\ 1 & 2 & 2 \\ 1 & 3 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$$

for

0

$$\textcircled{4} \quad \textcircled{2} + 2\textcircled{3} = 3x + 8y = 10$$

$$\begin{aligned} \textcircled{5} \quad \textcircled{1} \times 3 &\quad \quad \quad 3x = 10 - 8y \\ &\quad \quad \quad = 10 - 8y + 3y + 18z = 3 \\ &\quad \quad \quad 1 - 5y + 18z = -7 \end{aligned}$$

$$\textcircled{6} \quad \textcircled{1} \times 3 = 10 - 8y + 3y + 18z = 3$$

$$\textcircled{2} + \textcircled{6} = 1x + 8z = -6$$

$$x = -6 - 8z$$

$$8z = -6 - x$$

$$z = \frac{-6 - x}{8}$$

$$x + -6 - x = -6$$

$$z =$$

$$y =$$

$$x =$$

6) find partial fraction

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

$$2x^2-x-1 = (2x+1)(x-1)$$

$$3x+2 = A(x-1) + B(2x+1)$$

$$\text{if } x=1$$

$$3(1)+2 = A(1-1) + B(2(1)+1)$$

$$5 = B3$$

$$\underline{B = 5/3}$$

$$\text{if } x = -1/2$$

$$3(-1/2)+2 = A(-1/2-1) + B(2(-1/2)+1)$$

$$+1/2 = A(-3/2)$$

$$\underline{A = -1/3}$$

(20)