

Q1.

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

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

$$x - 12y + 5z \quad (5)$$

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

$$x^2 + 2x - x + 4$$

$$x^2 + x + 4 \quad (5)$$

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

$$12p^3q^4r \times 5qr^2$$

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

$$(iv) \quad \frac{6p^2q^3r}{3p^3q^3r^{-2}}$$

$$2p^{-1}r^3 \quad (5)$$

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

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

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

$$\frac{64}{2 \times 4 \times 8} f^5 g h \times \frac{768}{4 \times 16 \times 12} g h^4 f^3 \times \frac{2048}{32 \times 16 \times 4} f^2 h^5$$

$$0$$

$$\frac{64f^5gh}{16h\dots} \times \frac{768gh^4f^3}{16h\dots} \times \frac{2048f^2h^5}{16h\dots}$$

$$\left(\frac{16h \times 64f^5gh \times 12f^3}{768f^4h^2} \right)^3$$

Restart

Q1.
✓

$$\frac{2fg}{16h} \times \frac{6gh^2}{6fh} \times \frac{32fh^3}{12f^3}$$

$$\frac{2}{16} fgh^{-1} \times \frac{4}{4} gf^{-1}h \times \frac{32}{12} f^{-2}h^3$$

$$\left(\frac{2}{16} \times \frac{4}{4} \times \frac{32}{12} \right) (f \times f^{-1} \times f^{-2}) (g \times g) (h^{-1} \times h \times h^3)$$

$$\frac{1}{8} \times 1 \times \frac{8}{3} \times f^{-2} \times g^2 \times h^3$$

$$\frac{1}{8} \times \frac{8}{3} f^{-2}g^2h^3$$

$$\frac{3}{24} \times \frac{64}{24} = \frac{67}{24} f^{-2}g^2h^3$$

④

Q2.

$$\textcircled{1} \quad 5(x-3) = 2(x+6)$$

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

$$3x-15 = 12$$

$$3x = 27$$

$$x = 9$$

⑩

Q2.

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

$$\frac{x+6}{2} - \frac{x}{1} + \frac{2x-5}{3} = 0 \quad \text{70 ref.}$$

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

~~$$\frac{3x+18}{6} - \frac{6x}{6} - \frac{4x-10}{6} = 0$$~~

$$\frac{-7x+8}{6} = 0$$

$$3x+18 = 6x + 4x - 10$$

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

$$-7x = -28$$

$$7x = 28$$

$$x = 4$$

10

Q3.

$$(1) 2x + 4y = 16$$

$$(2) 3x + 2y = 7$$

$$(3) \times 2 \quad 6x + 4y = 14 \quad (3)$$

$$(3) - (1) \quad \begin{array}{r} 6x + 4y = 14 \\ - 2x + 4y = 16 \\ \hline 4x + 0y = -2 \\ 4x = -2 \\ x = -\frac{1}{2} \end{array}$$

10

sub x into (1).

$$2(-\frac{1}{2}) + 4y = 16$$

$$-1 + 4y = 16$$

$$4y = 17$$

$$y = \frac{17}{4}$$

check in (2)

$$3(-\frac{1}{2}) + 2(\frac{17}{4}) = 7$$

$$-1.5 + \frac{17}{2} = 7$$

$$-1.5 + 8.5 = 7$$

Q4.

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

$$\text{Determinant of } A = 1 \begin{vmatrix} 2 & 2 \\ 3 & -1 \end{vmatrix} - 1 \begin{vmatrix} 1 & 2 \\ 1 & -1 \end{vmatrix} + 6 \begin{vmatrix} 1 & 2 \\ 1 & 3 \end{vmatrix}$$

$$|A| = 1(2 \times -1 - 2 \times 3) - 1(1 \times -1 - 1 \times 2) + 6(1 \times 3 - 1 \times 2)$$

$$|A| = 1(-2 - 6) - 1(-1 - 2) + 6(3 - 2)$$

$$= -8 + 3 + 6$$

$$= 9 - 8$$

$$= 1$$

$$|A| = 1$$

$$A^{-1} = \frac{\text{adj } A}{|A| = 1}$$

Adj A $\rightarrow$ ~~$A_{11} = + \begin{vmatrix} 2 & 2 \\ 3 & -1 \end{vmatrix}$~~
 ~~$A_{12} = - \begin{vmatrix} 1 & 2 \\ 1 & -1 \end{vmatrix}$~~
 ~~$A_{13} = + \begin{vmatrix} 1 & 2 \\ 1 & 3 \end{vmatrix}$~~
 ~~$A_{21} = - \begin{vmatrix} 1 & 6 \\ 3 & -1 \end{vmatrix}$~~
 ~~$A_{22} = + \begin{vmatrix} 1 & 6 \\ 1 & -1 \end{vmatrix}$~~
 ~~$A_{23} = - \begin{vmatrix} 1 & 2 \\ 1 & 3 \end{vmatrix}$~~
 ~~$A_{31} = + \begin{vmatrix} 1 & 2 \\ 1 & -1 \end{vmatrix}$~~
 ~~$A_{32} = - \begin{vmatrix} 1 & 6 \\ 1 & -1 \end{vmatrix}$~~
 ~~$A_{33} = + \begin{vmatrix} 1 & 2 \\ 1 & 3 \end{vmatrix}$~~

to get C.

$$A_{11} = + \begin{vmatrix} 2 & 2 \\ 3 & -1 \end{vmatrix} = +(2 \times -1 - 2 \times 3) = +(-2 - 6) = -8$$

$$A_{12} = - \begin{vmatrix} 1 & 2 \\ 1 & -1 \end{vmatrix} = -(1 \times -1 - 2 \times 1) = -(-1 - 2) = 3$$

$$A_{13} = + \begin{vmatrix} 1 & 2 \\ 1 & 3 \end{vmatrix} = +(1 \times 3 - 2 \times 1) = +(3 - 2) = 1$$

$$A_{21} = - \begin{vmatrix} 1 & 6 \\ 3 & -1 \end{vmatrix} = -(1 \times -1 - 6 \times 3) = -(-1 - 18) = 19$$

$$A_{22} = + \begin{vmatrix} 1 & 6 \\ 1 & -1 \end{vmatrix} = +(1 \times -1 - 6 \times 1) = +(-1 - 6) = -7$$

$$A_{23} = - \begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix} = -(1 \times -1 - 1 \times 1) = -(-1 - 1) = 2$$

$$A_{31} = + \begin{vmatrix} 1 & 6 \\ 2 & 2 \end{vmatrix} = +(1 \times 2 - 6 \times 2) = +(2 - 12) = -10$$

$$A_{32} = - \begin{vmatrix} 1 & 6 \\ 1 & 2 \end{vmatrix} = -(1 \times 2 - 6 \times 1) = -(2 - 6) = 4$$

$$A_{33} = + \begin{vmatrix} 1 & 1 \\ 1 & 2 \end{vmatrix} = +(1 \times 2 - 1 \times 1) = +(2 - 1) = 1$$

$$C = \begin{bmatrix} -8 & 3 & 1 \\ 19 & -7 & 2 \\ -10 & 4 & 1 \end{bmatrix}$$

$$C^t = \begin{bmatrix} -8 & 19 & -10 \\ 3 & -7 & 4 \\ 1 & 2 & 1 \end{bmatrix}$$

9

$$A^{-1} = \begin{bmatrix} -8 & 19 & -10 \\ 3 & -7 & 4 \\ 1 & 2 & 1 \end{bmatrix}$$

$$\frac{\text{adj } A}{|A|} = \frac{C^t}{1} = C^t = A^{-1}$$

Q5.

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

Answer from Q4 $A^{-1}b = X$

$$\begin{bmatrix} -8 & 19 & -10 \\ 3 & -7 & 4 \\ 1 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$


~~3x3 3x1~~ ~~-8x1 + 19x2 + -10x4~~

$$\begin{bmatrix} -8 \times 1 + 19 \times 2 + -10 \times 4 \\ 3 \times 1 + -7 \times 2 + 4 \times 4 \\ 1 \times 1 + 2 \times 2 + 1 \times 4 \end{bmatrix} = \begin{bmatrix} -8 + 38 + 40 \\ 3 - 14 + 16 \\ 1 + 4 + 4 \end{bmatrix} = \begin{bmatrix} -10 \\ 5 \\ 9 \end{bmatrix}$$

$$x = -10$$

$$y = 5$$

$$z = 9$$

$$\text{check: } -10 + 5 + 6(9) = 1.$$

Well im wrong.
Somewhere.

Q6. $\frac{3x+2}{2x^2+x-1}$

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

~~$= \frac{1 \pm \sqrt{5}}{4}$~~

not solve.

~~$= \frac{1 \pm \sqrt{5}}{4}$~~

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

~~$= \frac{1 \pm \sqrt{5}}{4}$~~

~~$= \frac{1 \pm 3}{4}$~~
 ~~$x =$~~

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

Factorise: $2x^2 - x - 1$.

$= -2 \quad ac = -2 \quad -2, 1.$
 $\text{add to } -1. \quad b = -1.$

$2x^2 - 2x + x - 1.$

$2x(x-1) + 1(x-1).$

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

$\frac{3x+2}{(2x+1)(x-1)}$

Q6 continued

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

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

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

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

$$3+2 = A(0) + B(2+1)$$

$$5 = 3B$$

$$\frac{5}{3} = B$$



$$\text{Sub in } x = -\frac{1}{2}$$

10

$$3(-\frac{1}{2})+2 = A(-\frac{1}{2}-1) + B(2(-\frac{1}{2})+1)$$

$$-\frac{3}{2}+2 = -\frac{3}{2}A + B(0)$$

$$-\frac{7}{2} = -\frac{3}{2}A$$

$$\frac{7}{2} = \frac{3}{2}A$$

$$7 = 3A$$

$$\frac{7}{3} = A$$

$$\frac{7}{3(2x+1)} + \frac{5}{3(x-1)} = \frac{3x+2}{(2x+1)(x-1)}$$

~~$$\frac{7}{6x+3} + \frac{5}{3x-3}$$~~

$$\frac{7}{6x+3} + \frac{5}{3x-3} \quad \text{simplified.}$$