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5

12 Pages

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[illegible]

89%
Good

✓ GT Feb 25

Q1

$$a) \quad 5x + y - 2z - 3x - 4y + z + 2x - y + 3z \\ = 4x - 4y + 2z$$

5

$$b) \quad 2x(x+3) - x(x+6)$$

$$\Rightarrow 2x^2 + 6x - x^2 - 6x = x^2$$

5

$$c) \quad 2p^4qr \times 3pq^2 \times 4pr^4$$

$$= 24p^6q^3r^5$$

$$2 \times 3 \times 4 = 24$$

$$p^4 \times p \times p = p^6$$

$$q \times q^2 = q^3$$

$$r \times r^4 = r^5$$

5

$$d) \quad \frac{12p^5qr}{3p^3q^2r^{-2}}$$

$$\frac{12}{3} = 4$$

$$\frac{p^5}{p^3} = p^2$$

$$\frac{q}{q^2} = \frac{1}{q} \text{ or } q^{-1}$$

$$\frac{r}{r^{-2}} = r^3$$

$$\Rightarrow 4p^2r^3q^{-1}$$

5

Q1

$$e) \frac{fg}{4h} \times \frac{gh^2}{fh} \times \frac{8fh^3}{2f^3}$$

$$\frac{fg \times gh^2 \times 8fh^3}{4h \times fh \times 2f^3} \Rightarrow \frac{8g^2f^2h^5}{8h^2f^4}$$

$$\Rightarrow \frac{g^2f^2h^5}{h^2f^4}$$

$$\Rightarrow g^2h^3f^{-2}$$

(5)

25

Q2

$$a) 3(x+2) = 2(x-4)$$

$$\Rightarrow \begin{array}{cc} 3x+6 & = & 2x-8 \\ -2x & & -2x \end{array}$$

$$\Rightarrow \begin{array}{cc} x+6 & = & -8 \\ -6 & & -6 \end{array}$$

$$\Rightarrow x = -14$$

(8)

✓

Q2

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

Multiply through by 6 ✓

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

$$\Rightarrow 2(x-3) = \cancel{7x} + 2$$

$$2x - 6 = 7x + 2$$

$$\begin{array}{cc} -2x & -2 \\ -2x & -2 \end{array}$$

$$\Rightarrow -8 = 5x \Rightarrow x = -\frac{8}{5}$$

12 ✓

Q3

$$① 4x + 2y = 2$$

$$② 2x - 5y = 7$$

$$② \times 2 = 4x - 10y = 14 \quad ③$$

$$③ - ① = -12y = 12$$

$$y = \frac{12}{-12} \therefore y = -1$$

$y = -1$, Substitute into ①

$$4x + 2(-1) = 2$$

$$4x - 2 = 2$$

$$4x = 4$$

$$x = 1$$

10 ✓

Q6

$$P(x) = \frac{2x+5}{x^2+5x+6}$$

$$\frac{2x+5}{(x+2)(x+3)} = \frac{A}{x+2} + \frac{B}{x+3}$$

$$2x+5 = A(x+3) + B(x+2)$$

$$\text{Let } x = -3: 2(-3)+5 = A(-3+3) + B(-3+2)$$

$$\Rightarrow -1 = -B$$

$$\Rightarrow B = 1$$

$$\text{Let } x = -2: 2(-2)+5 = A(-2+3) + B(-2+2)$$

$$\Rightarrow 1 = A$$

$$\Rightarrow \frac{2x+5}{x^2+5x+6} = \frac{1}{x+2} + \frac{1}{x+3}$$

20



Q4

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

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

$$ad - bc$$

$$|A| = +1 \begin{vmatrix} -1 & 1 \\ 2 & -1 \end{vmatrix} - 0 \begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix} + 2 \begin{vmatrix} 1 & -1 \\ 1 & 2 \end{vmatrix}$$

$$|A| = +1([(-1 \times -1) - (2 \times 1)]) - 0([1 \times -1] - [1 \times 1]) + 2([1 \times 2] - [1 \times -1])$$

$$|A| = 1(1 - 2) - 0(-1 - 1) + 2(2 - (-1))$$

$$|A| = -1 + 6$$

$$|A| = 5$$

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

$$\Rightarrow A^{-1} = \frac{1}{5}$$

Q5

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

$$|A| = 5$$

$$A^{-1} = \frac{1}{5}$$

X

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

$$x + 0y + 2z = -2$$

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

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

+ - +

- + -

+ - +

$$\begin{bmatrix} 1 & 0 & 2 \\ 1 & -1 & 1 \\ 1 & 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -2 \\ -2 \\ 3 \end{bmatrix}$$

$$A \underline{X} = \underline{b}$$

$$\Rightarrow \underline{X} = A^{-1} \underline{b}$$

Find matrix of co-factors

$$\begin{bmatrix} \begin{vmatrix} -1 & 1 \\ 2 & -1 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix} & \begin{vmatrix} 1 & -1 \\ 1 & 2 \end{vmatrix} \\ \begin{vmatrix} 0 & 2 \\ 2 & -1 \end{vmatrix} & \begin{vmatrix} 1 & 2 \\ 1 & -1 \end{vmatrix} & \begin{vmatrix} 1 & 0 \\ 1 & 2 \end{vmatrix} \\ \begin{vmatrix} 0 & 2 \\ -1 & 1 \end{vmatrix} & \begin{vmatrix} 1 & 2 \\ 1 & 1 \end{vmatrix} & \begin{vmatrix} 1 & 0 \\ 1 & -1 \end{vmatrix} \end{bmatrix} = A^*$$

no nbs in front
of 1 1 in
cofactor matrix

10

Q5 $A^* = \begin{bmatrix} -1 & 0 & 6 \\ 4 & 3 & -2 \\ 2 & 2 & 1 \end{bmatrix}$ ~~ad-bc~~ sequentially carried out

do some flip or something?

$A^T = \begin{bmatrix} -1 & 4 & 2 \\ 0 & 3 & -2 \\ 6 & -2 & 1 \end{bmatrix}$

mult mod ch!
emiss in C
and CT

$$\begin{bmatrix} -1 & 4 & 2 \\ 0 & 3 & -2 \\ 6 & -2 & 1 \end{bmatrix} \begin{bmatrix} -2 \\ -2 \\ 3 \end{bmatrix}$$

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

$$0(-2) + 3(-2) + -2(3) = 0$$

$$6(-2) + -2(-2) + 1(3) = 5$$

4

~~4~~