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100

Q1)

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

$$2x - 5x + 4x = x$$

$$4y - 9y - 7y =$$

$$-5z + 2z + 8z =$$

$$\underline{x - 12y + 5z} \therefore$$

$2x$	$4y$	$-5z$
$-5x$	$-9y$	$+2z$
$+4x$	$-7y$	$+8z$
x	$-12y$	$+5z$

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

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

$$\underline{x^2 + x + 4} \therefore$$

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

$$= 60p^3q^5r^3$$

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

$$2p^{-1}r^{-1}$$

v) $\frac{28g}{16H} \times \frac{4gh^2}{48h} \times \frac{32Fh^2}{12f^3}$

$$\frac{28g \times 4gh^2 \times 32Fh^2}{16H \times 48h \times 12f^3} = \frac{256g^2h^4}{768f^3h^2}$$

0

Q2)

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

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

$$3x = 12 + 15$$

$$3x = 27$$

$$x = 9$$

10

$$5(9-3) = 2(9+6)$$

$$5(6) = 2(15)$$

$$30 = 30 \quad \checkmark$$

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

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

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

$$(3x+18) - (4x-10)$$

$$\frac{-x+28}{6} = x$$

~~x6~~

$$-x + 28 = 6x$$

$$-6x + 168 = 6x$$

$$168 = 12x$$

$$\frac{168}{12} = x$$

$$14 = x$$

2

Q3)

i) ① $2x + 4y = 16$
② $3x + 2y = 7$

$$\begin{array}{r} \textcircled{1} - \textcircled{2} \times 2 = 2x + 4y = 16 \\ \quad \quad \quad 6x + 4y = 14 \\ \hline -4x + 0 = 2 \end{array}$$

$$-4x = 2$$

$$4x = -2$$

$$x = \frac{-2}{4}$$

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

Sub x into 1

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

$$-1 + 4y = 16$$

$$4y = 17$$

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

10

$$2 \times \textcircled{2} - \textcircled{1} = 6x + 4y = 14 -$$

$$2x + 4y = 16$$

$$4x = -2$$

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

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

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

$$2y = 7 + \frac{3}{2}$$

$$\begin{array}{l} x = -\frac{1}{2} \\ y = \frac{17}{4} \end{array}$$

Q4)

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

$$\begin{pmatrix} + & - & + \\ - & + & - \\ + & - & + \end{pmatrix}$$

$$(ad-bc)$$

$$\begin{aligned} |A| &= +1 \begin{vmatrix} 2 & 2 \\ 3 & -1 \end{vmatrix} - 1 \begin{vmatrix} 1 & 2 \\ 1 & -1 \end{vmatrix} + 6 \begin{vmatrix} 1 & 2 \\ 1 & 3 \end{vmatrix} \\ &= +1(-2-6) - 1(-1-2) + 6(3-2) \\ &\quad -8 \quad \quad +3 \quad \quad +6 \end{aligned}$$

$$\det \text{ of } A = -8+9 = 1$$

$$A^{-1} = \left(\frac{1}{\det A} \right) \text{adj } A$$

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

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

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

(2)

$$\text{Inverse of } A = \frac{\begin{bmatrix} 1 & -1 & 1 \\ -1 & 2 & -3 \\ 6 & -2 & 1 \end{bmatrix}}{1}$$

Q5)

i) ① $1x + 1y + 6z = 1$

② $1x + 2y + 2z = 2$

③ $1x + 3y - 1z = 4$

~~① - ②~~ = ~~$x + y + 6z = 1$~~
~~③ - ①~~ = ~~$x + 2y + 2z = 2$~~

② - ① = $x + 2y + 2z = 2$ -
 $x + y + 6z = 1$
 $0 + y - 4z = 1$

④ $y - 4z = 1$

③ - ② = $x + 3y - z = 4$ -
 $x + 2y + 2z = 2$

⑤ $0 + y - 3z = 2$

⑤ - ④ $y - 3z = 2$ -
 $y - 4z = 1$

 $0 \quad z = 1$

$z = 1$

① $1x + 1y + 6(1) = 1$

② $1x + 2y + 2(1) = 2$

③ $1x + 3y - 1(1) = 4$

New

① $1x + 1y = -5$

② $1x + 2y = 0$

③ $1x + 3y = 5$

③ - ② = $x + 3y = 5$ -
 $x + 2y = 0$

 $0 + y = 5$
 $y = 5$

$y = 5$

$x = -10$

~~$10 + 5 + 6z = 1$~~

$$\begin{aligned} x &= -10 \\ y &= 5 \\ z &= 1 \end{aligned}$$



$1(x) + 1(5) + 6(1) = 1$

$x + 5 + 6 = 1$

$x = -10$

Q6)

$$\frac{f(x)}{(x+a)(x+b)} = \frac{\textcircled{A}}{x+a} + \frac{\textcircled{B}}{x+b}$$

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

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

$$?x + ? = (A_1 + A_2)$$

$$3x+2 = A(A_1 + A_2) + B(A_1b_1 + b_2)$$

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

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

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

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

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

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

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

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

$$= 4x - \frac{11}{2}$$

$$4x = \frac{11}{2}$$

$$x = \frac{11}{8}$$

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

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

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

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

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

$$3x+2 =$$

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

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

$$2(x+2) = B$$

$$2x+4 = B$$

$$3x + \frac{3}{2} = 2x$$

$$\frac{3x + \frac{3}{2}}{2x} = A$$

$$\frac{3}{2}x + \frac{3}{4} = A$$

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

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