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Examiner Only

Examination Answer Books

12 Pages

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1	Student Number	
2	Title of Examination Paper	Paper 1
3	Module Code	
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[illegible]

93%
Very good

GT Feb 25

$$k) 5x + y - 2z - 3x - 4y + z + 2x - y + 3z$$

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

(5)

$$b) 2x(x+3) - 3xy^2 + 4 - x(x+6)$$

$$= 2x^2 + 6x - 3xy^2 + 4 - x^2 - 6x$$

$$= x^2 + 4$$

(5)

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

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

(5)

$$d) \frac{12p^5qr}{3p^3q^2r^{-2}} = 4p^{2-1}r^3$$

$$g^4gh \times gh^2j^2 \times 8gh^4$$

$$(gg)j^3h \times gh^2(j)^2 \times 8gh^3(h)$$

(5)

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

$$= \frac{fg^2h^2}{j^2} \times h$$

$$g^4gh \times gh^2j^2 \times 8gh^4$$

$$= 8g^2h^2j^2 \times h^5$$

$$= 8g^2h^7j^2$$

(2)

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

$$3x + 6 = 2x - 8$$

$$-2x \quad -2x$$

$$x + 6 = -8$$

$$-6 \quad -6$$

$$x = -14$$

(8)

$$bii) \frac{(x-3)}{3} = x + \frac{(x+2)}{8}$$

$$\times 6$$

$$2(x-3) = 6x + \frac{6(x+2)}{8}$$

$$2x - 6 = 6x + \frac{6x+12}{8}$$

$$-2x \quad -2x$$

$$-6 = 5x + \frac{6x+12}{8}$$

$$-8 = 5x$$

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

(12)

$$\begin{aligned}
 3a \quad & 4x + 2y = 2 \quad (1) \\
 & 2x - 5y = 7 \quad (2) \times 2 \\
 & 4x - 10y = 14 \quad (3)
 \end{aligned}$$

$$(3) - (1) \quad \checkmark$$

$$4x - 10y = 14$$

$$4x + 2y = 2 \quad \checkmark$$

$$-12y = 12$$

$$y = -1$$

sub $y = -1$ into (1)

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

$$4x - 2 = 2$$

$$4x = 4$$

$$x = 1$$

$x = 1$ and $y = -1$

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$$4 \quad A = \begin{bmatrix} 1 & 0 & 2 \\ 1 & -1 & 1 \\ 1 & 2 & -1 \end{bmatrix} \quad \begin{bmatrix} + & - & + \\ - & + & - \\ + & - & + \end{bmatrix}$$

$$1 \begin{vmatrix} -1 & 1 \\ 2 & -1 \end{vmatrix} - 0 \begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix} + 2 \begin{vmatrix} 1 & -1 \\ 1 & 2 \end{vmatrix} \quad \checkmark$$

$$1((-1)(-1) - 2) - 0((1)(1) - 1) + 2((1)(2) - (-1)(1))$$

$$1(-1) - 0 + 6$$

$$-1 + 0 + 6 = 5$$

$$\text{determinant} = \frac{1}{5} = \frac{1}{5} \quad \checkmark$$

$$14 = 5$$

$$\begin{aligned}
 & + \begin{vmatrix} -1 & 1 \\ 2 & -1 \end{vmatrix} - \begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix} + \begin{vmatrix} 1 & -1 \\ 1 & 2 \end{vmatrix} \\
 & - \begin{vmatrix} 0 & 2 \\ 2 & -1 \end{vmatrix} + \begin{vmatrix} 1 & 2 \\ 1 & -1 \end{vmatrix} - \begin{vmatrix} 1 & 0 \\ 1 & 2 \end{vmatrix} \\
 & + \begin{vmatrix} 0 & 2 \\ -1 & 1 \end{vmatrix} - \begin{vmatrix} 1 & 2 \\ 1 & 1 \end{vmatrix} + \begin{vmatrix} 1 & 0 \\ 1 & -1 \end{vmatrix}
 \end{aligned}$$

$$(0x - 1 - 4)$$

$$4$$

$$\begin{bmatrix} -1 & 2 & 3 \\ 4 & -3 & -2 \\ 2 & 1 & -1 \end{bmatrix}^T = \frac{1}{5} \begin{bmatrix} -1 & 4 & 2 \\ 2 & -3 & 1 \\ 3 & -2 & -1 \end{bmatrix} = A^{-1}$$

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Q5. $x + 0y + 2z = -2$
 $x - y + z = -2$
 $x + 2y + z = 3$

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

$X = A^{-1}B$

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

$$x = A^{-1} \times B$$

$$\begin{bmatrix} 1 \\ 5 \\ 5 \end{bmatrix} \times \begin{bmatrix} -1 & 4 & 2 \\ 2 & -3 & 1 \\ 3 & -2 & -1 \end{bmatrix} \begin{bmatrix} -2 \\ -2 \\ 3 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

$$\frac{1}{5} \times \begin{bmatrix} -1 \times -2 + (4 \times -2) + 2 \times 3 \\ 2 \times (-2) + (-3 \times -2) + 3 \times 1 \\ 3 \times (-2) + (-2 \times -2) + 3 \times (-1) \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

$$2 + -8 + 6 = -2 \quad x = 0$$

$$\frac{1}{5} \times 0 = x$$

$$2 \times -2 + (-3 \times -2) + 3 \times 1 = y$$

$$3 \times -2$$

$$y = 2 \times (-2) + (-3 \times -2) + 3 \times 1$$

$$y = -4 + 6 + 3 = 5 \times \frac{1}{5} = y = 1$$

$$z = 3 \times (-2) + (-2 \times -2) + 3 \times (-1) = -6 + 4 - 3 = -5 \times \frac{1}{5} = -1 = z$$

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

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Q6
 Sol) $\frac{2x+5}{x^2+5x+6} = \frac{A}{(x+2)} + \frac{B}{(x+3)}$

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

Sub $x = -3$

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

$$-1 = -1B$$

$$B = 1$$

Sub $x = -2$

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

$$1 = A$$

$$B = 1$$

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

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This is a very good effort!
 Well Done!

Answer yn unig