

63%

Elsadiq Ishag

Q1=[24/35]

Q2=[18/32]

Q3=[21/33]

the Determinant of A

$$\begin{bmatrix} 2 & 0 & 3 \\ 1 & 8 & 3 \\ 0 & 2 & 0 \end{bmatrix} \quad 2 \begin{vmatrix} 8 & 3 \\ 2 & 0 \end{vmatrix} + 0 \begin{vmatrix} 1 & 3 \\ 0 & 0 \end{vmatrix} + 3 \begin{vmatrix} 1 & 8 \\ 0 & 2 \end{vmatrix}$$

$$2(-6) + 0 + 3(2-8)$$

$$\cancel{8 \times 0} + 2 \times 3 = -12 - \overset{+6}{18} = -30 \quad [2/4]$$

ii) the Determinant of C

$$C = \begin{bmatrix} 1 & 4 \\ 2 & -5 \\ 3 & 1 \end{bmatrix} \quad \begin{vmatrix} 1 & 4 \\ 2 & -5 \end{vmatrix} \quad \begin{vmatrix} 2 & -5 \\ 3 & 1 \end{vmatrix} \quad \times$$

$$\begin{aligned} -15 + 8 &= -7 \\ -7 - (-7) &= 0 \end{aligned}$$

iii) the determinant D

$$\begin{bmatrix} 2 & 4 \\ -3 & 8 \end{bmatrix}$$

$$2 \times 8 - (-3 \times 4) = 16 + 12 = 28 \quad [2/2]$$

$$iv) AB = \begin{bmatrix} 2 & 0 & 3 \\ 1 & 8 & 3 \\ 0 & 2 & 0 \end{bmatrix} \begin{bmatrix} 3 & 0 & 2 \\ 2 & 2 & 0 \\ 1 & 3 & 6 \end{bmatrix}$$

$$\begin{bmatrix} \overset{\times}{8} & 9 & 22 \\ 22 & \overset{\times}{25} & \overset{\times}{20} \\ 4 & \overset{\times}{4} & 0 \end{bmatrix} \quad [1/4]$$

3x3
3x3 x 2x2

Elsatig [shag

$$(V) B < \begin{bmatrix} 3 & 0 & 2 \\ 2 & 5 & 0 \\ 1 & 3 & 6 \end{bmatrix} \begin{bmatrix} 1 & 4 \\ 2 & -5 \\ 3 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 9 & 14 \\ 12 & -2 \times \\ 25 & -5 \end{bmatrix} [3/4]$$

(Vi) D < ~~can't do~~

$$\begin{bmatrix} 2 & 4 \\ -3 & 3 \end{bmatrix} \begin{bmatrix} 1 & 4 \\ 2 & -5 \\ 3 & 1 \end{bmatrix} [1/1] \text{ Can't do}$$

$2 \times 2 \quad 3 \times 2$

Vii. AD can't do [1/1]

$$(b) |A| = 2 \begin{vmatrix} 4 & 7 \\ 5 & 2 \end{vmatrix} - 4 \begin{vmatrix} 1 & 7 \\ 0 & 2 \end{vmatrix} + 1 \begin{vmatrix} 1 & 4 \\ 0 & 5 \end{vmatrix}$$

$-5 = 57 [2/2]$

$$\begin{bmatrix} \begin{vmatrix} 4 & 7 \\ 5 & 2 \end{vmatrix} & \begin{vmatrix} 1 & 7 \\ 0 & 2 \end{vmatrix} & \begin{vmatrix} 1 & 4 \\ 0 & 5 \end{vmatrix} \\ \begin{vmatrix} 4 & 1 \\ 5 & 2 \end{vmatrix} & \begin{vmatrix} 2 & 1 \\ 0 & 2 \end{vmatrix} & \begin{vmatrix} 2 & 4 \\ 0 & 5 \end{vmatrix} \\ \begin{vmatrix} 4 & 1 \\ 4 & 7 \end{vmatrix} & \begin{vmatrix} 2 & 1 \\ 1 & 7 \end{vmatrix} & \begin{vmatrix} 2 & 4 \\ 1 & 4 \end{vmatrix} \end{bmatrix} = \begin{bmatrix} -27 & -2 & 5 \\ -3 & 4 & -10 \\ 24 & -13 & 4 \end{bmatrix}$$

$$= \frac{1}{-57} \begin{bmatrix} -27 & -2 & 24 \\ -3 & 4 & -13 \\ 5 & -10 & 4 \end{bmatrix} [9/10]$$

Elsadiq Ishag

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

$$\begin{array}{ccc|cc} 3 & -2 & 1 & 3 & 2 \\ 1 & -3 & 2 & 1 & 3 \\ 2 & 1 & -3 & 2 & 1 \end{array}$$

$$6+6+6=18$$

[3/8]

correct method
error carried over

$$27+8+1=36-18=18$$

we place the solution with the first column to find x

$$\begin{array}{ccc|cc} 2 & 2 & 1 & 2 & 2 \\ 1 & 3 & 2 & 1 & 3 \\ -5 & 1 & 3 & -5 & 1 \end{array}$$

$$-15+4+6=-5$$

$$18+20+1=-1$$

$$-1-(-5)=4$$

we place the solution with second column to find y

$$\begin{array}{ccc|cc} 3 & 2 & 1 & 3 & 2 \\ 1 & 1 & 2 & 1 & 1 \\ 2 & -5 & 3 & 2 & -5 \end{array}$$

$$2-30+6=-22$$

$$9+8+5=12$$

$$12-(-22)=36$$

we place the solution with third column to find z

$$\begin{array}{ccc|cc} 3 & 2 & 2 & 3 & 2 \\ 1 & 3 & 1 & 1 & 3 \\ 2 & 1 & -5 & 2 & 1 \end{array}$$

$$12+3-10$$

$$-45+4+2=-37$$

$$-37-5=-42$$

~~Question two~~

Elsadig Ishag

Question two

$$i) z_1 + z_2 = (2 + 5j) + (3 + 2j) = 5 + 7j \quad [1/1]$$

$$ii) 3z_2 + 2z_3 = 3(3 + 2j) + 2(4 + 3j) \\ = (9 + 6j) + 8 + 6j = 17 + 12j \quad [3/3]$$

$$iii) z_1^2 + z_2 = (2 + 5j)^2 + (3 + 2j)$$

$$(2 + 5j)(2 + 5j) = 4 + 10j + 10j + 25j^2 \\ = 4 + 20j - 25 = -21 + 20j \\ -21 + 20j + 3 + 2j = -18 + 22j \quad [3/3]$$

$$iv) z_1 \cdot z_2 = (2 + 5j)(3 + 2j)$$

$$(6 + 4j + 15j + 10j^2) \\ 6 + 19j + 10 = -4 + 19j \quad [3/3]$$

$$v) \frac{z_1}{z_2} = \frac{2 + 5j}{3 + 2j} \times \frac{3 - 2j}{3 - 2j} = \frac{6 - 4j + 15j - 10j^2}{9 - 6j + 6j + 4j^2}$$

$$\frac{6 + 11j + 10}{9 + 4} = \frac{16 + 11j}{-5 + 13} = \frac{16}{-5} + \frac{11}{-5}j$$

$$b) \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad [3/5] \quad b=8 \quad a=5 \quad c=5$$

$$\frac{-8 \pm \sqrt{(8)^2 - 4(5)(5)}}{2 \times 5} = \frac{-8 \pm \sqrt{64 - 100}}{10} = \frac{-8 \pm \sqrt{-36}}{10}$$

$$= \frac{-8 \pm 6\sqrt{-1}}{10} = \frac{-8}{10} \pm \frac{6}{10}j \quad [5/10]$$

$$i. \int x(x^2 + 3x) dx = \int x^3 + 3x^2 dx$$

$$= \frac{1}{4}x^4 + x^3 + C \quad [4/4]$$

$$ii.) \int ((x+2)(2x+1) - \sin 4x) dx$$

$$\int 2x^2 + x + 4x + 2 - \sin 4x dx$$

$$= \int 2x^2 + 5x + 2 - \sin 4x dx$$

$$= \frac{2x^3}{3} + \frac{5x^2}{2} + 2x + \frac{1}{4} \cos 4x + C \quad [4/4]$$

$$iii.) \int_0^2 (3x^2 + 2x - 5) dx$$

$$= \left[x^3 + x^2 - 5x \right]_0^2 = \left[(2)^3 + (2)^2 - 5(2) \right] -$$

$$[8 + 4 - 10] = \underline{\underline{2}} \quad [4/4]$$

Elsadig Ishag

$$w) \int_0^1 (5x^4 + 3e^x) dx = \int (5x^4 + 3e^x) dx$$

$$= \left[x^5 + 3e^x + C \right]_0^1 = \left[1^5 + 3e^1 + C \right]$$

$$[1 + 3 \times 2.718] = 9.15 - [0 + 3e^0]$$

$$= 9.15 - 3 = \underline{\underline{6.15}} \quad [4/4]$$

$$b) - \int bx u dx = \int u \cdot bx dx$$

$$\int dv = \int bx dx \quad u = u$$

$$v = 3x^2 \quad \times$$

$$c) \int x \sin x dx$$

$$u = x \quad \frac{du}{dx} = 1 \quad du = dx$$

$$\int dv = \int \sin x dx \quad [5/10]$$

$$v = -\cos x + C$$