

Q2

given that $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ $b = \begin{bmatrix} 1 & 1 & 1 \\ -1 & -1 & -1 \\ 1 & 1 & 1 \end{bmatrix}$

$$AB = \begin{pmatrix} 6 \\ 15 \\ 24 \end{pmatrix} \quad \begin{pmatrix} -6 \\ -15 \\ -24 \end{pmatrix}$$

$$\begin{pmatrix} 6 & -6 & 6 \\ 15 & -15 & 15 \\ 24 & -24 & 24 \end{pmatrix}$$

$$A-B = \begin{bmatrix} 0 & 1 & 2 \\ 5 & 6 & 7 \\ 6 & 7 & 8 \end{bmatrix}$$

$$A+B = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \\ 8 & 9 & 10 \end{bmatrix}$$

$$A^T = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \text{ transpose} = \begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$$

Given $A = \begin{bmatrix} 3 & 1 & -4 \\ 6 & 9 & -2 \\ -1 & 2 & 1 \end{bmatrix}$

determinant =

$$\begin{vmatrix} 3 & 1 & -4 \\ 6 & 9 & -2 \\ -1 & 2 & 1 \end{vmatrix} = \begin{vmatrix} 9 & -2 \\ 2 & 1 \end{vmatrix} \quad a = 13$$

$a(3(9 \times 1) - (-2 \times 2)) = 12$

$b(6 \times 1) - (-2 \times -1) = 12$

$(6 \times 2) - (9 \times -1) = 21$

$$\begin{vmatrix} 6 & -2 \\ -1 & 1 \end{vmatrix} \quad b = 12$$

$(3 \times 13) = (-1 \times 12) = (-4 \times 21) = \begin{vmatrix} 6 & 9 \\ -1 & 2 \end{vmatrix} \quad c = 21$

$39 - 12 - 84 = -57$

The determinant = -57

2) $C = \begin{cases} x + y - z = 1 & z = 2y - 8 \\ 3x - 2y + z = -5 \\ x + 3y - 2z = 14 \end{cases}$

$\rightarrow -11y + 7(2y - 8) = -47 \quad 3y = 9$
 $y = 3$

$\rightarrow$ Solve for $z = (-3y + 22 + 14) +$
 $-9 + -4 + 14 = 1 \quad y - z = 6$
 $-2y + z = -8$

$x = -3y + 2z + 14 = (-3(3) + 2(-2) + 14) =$

$z = 2y - 8 = 2(3) - 8 = -2$

$y = 3$

ANSWER

$x = 1 \quad y = 3 \quad z = -2$

$(-3y + 2z + 14) - 2y + z = 5$

$-11y + 7z = -47$

$$4) \quad x^2 \rightarrow nx^{n-1}$$

$$1) \quad q x^2 = q \frac{d}{dx} [x^2] = \frac{d}{dx} [x^n] \text{ is } nx^{n-1} \quad n \geq 2$$

$$q(2x) = 19x$$

$$2) \quad x^2 + \sin 5x = \quad \sin x = \cos x$$

$$\frac{d}{dx} [\sin 5x] = \cos 5x$$

$$\frac{d}{dx} [5x] = \cos 5x = \frac{5 \cos 5x}{5}$$

$$5x^2 \cos 5x$$

$$3) \quad x e^{2x} = \frac{1}{2} x e^{2x} - \frac{1}{2} \int e^{2x} =$$

$$\frac{1}{2} x e^{2x} - \frac{1}{4} e^{2x} + C$$

b1)

$$16) \quad \begin{array}{rcl} 2x + 3y & = & 12 \\ 5x + 3y & = & 9 \\ \hline 7 & & 21 \end{array}$$

$$7x = 21$$

$$x = 3$$

$$(5 \times 3) = 15 + 3y = 9$$

$$2(3) + 3y = 12$$

$$6 + 3y = 12$$

$$3y = 12 - 6 \quad \Rightarrow \quad y = 2$$

$$5(3) + 3y = 9$$

$$15 + 3y = 9$$

Quad formulae

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$1c) x^2 - 7x + 12 = 0$$

$$a \quad b \quad c$$

$$\frac{7 \pm \sqrt{(-7)^2 - 4(1)(12)}}{2(1)} =$$

$$\frac{7 \pm \sqrt{49 - 48}}{2} =$$

$$\frac{7 \pm 1}{2} =$$

$$x = 4 \text{ or } 3$$

$$(4)^2 - 7(4) + 12 =$$

$$16 - 28 + 12 = 0$$

$$x = 4$$