



## 4MM013 - Computational Mathematics

## Mathematics Assignment-2

Full Marks: 20

University ID : 2329767

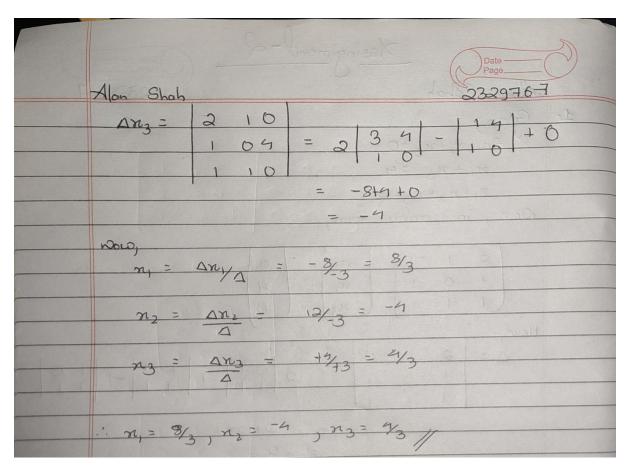
Submitted by : Alan Shah

Submitted on : 4/21/2023

1. Using Cramer's rule obtain the solutions to the following set of equations:

$$2 x_1 + x_2 - x_3 = 0$$
$$x_1 + x_3 = 4$$
$$x_1 + x_2 + x_3 = 0$$

	Masingment - 2 Costs Propos
1:	Given; 2n,+n,-n3=0
	74 + Ny = 4
	Now in matrix form;
	21-1 21 0
	2 1 -1
	Here
	A = 2 1 -1   1   1   1   1   1
	A = 2 1 -1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	= -2+0-1
	= -3
T	An, = 0 1 -1 = -1 1 1 4 6
	901 = - 101
	= 2 -1/1 - 01 1 - 1 1/1
	= 8 +/1
	= 1/2 = -8
	AM, = 2 0 -1
	10101
	= 8+4
	= 12 1 2 5



(4)

2.

a) Solve the following using Gauss elimination:

$$x_1 + x_2 + x_3 = 2$$
$$2x_1 + 3x_2 + 4x_3 = 3$$
$$x_1 - 2x_2 - x_3 = 1$$

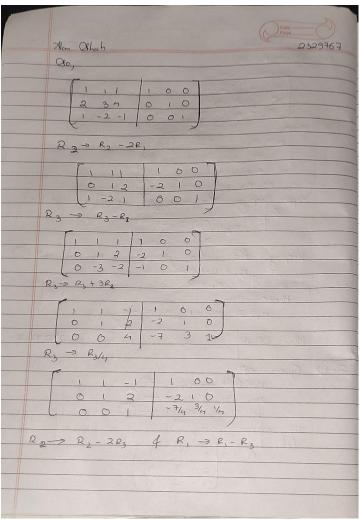
	Alon Oshah 2329767
2.	a) Given eqn; $n_1 + n_2 + n_3 = 2$ — (i) $2n_1 + 3n_2 + 4n_3 = 3$ — (ii)
	Now, in medicix form,
	(AB) = 1 11 : 2 2 3 4 : 3 1 -2 -1 : 1
	Here $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

Date—Page
Man Oshah 2329767
$R_3 \rightarrow R_3 + 3R_2$
111:200
0 12:-1
4 - 2
Here, $n_1 + n_2 + n_3 = 2$
n, +n3 = -1 - 0
473-4
ov, n3 = -1
Keppi Keeping the value of eq. (i) in eq. (v)
$n_2 + (-1) \cdot 2 = -1$
$n_2=1$
Keeping the value of ny f nz in ear ()
$n_1 + 1 - 1 = 2$
$n_1 = 2$
$n_1 = 2, n_2 = 1, n_3 = -1$

(4)

b) Find the inverse of the matrix from (a) using elimination.

	Mon Oshah 2329767
	16 11 11 11 11 12 2 3
2.6	Given eqn.
	ny+ ny+ ny = 2 -0
	$2n_1 + 3n_2 + 9n_3 = 3 - (ii)$
	$n_1 - 2n_2 - n_3 = 1$
HE WAS TO SEE	In medicix forces
	A =   1   1
	2 3 4
	(1 -2 -1)



Alon S	Shah					Date	
	1	1	0	11/4	-3/4	-1/4	232976
	0	1	0	3/2	-1/2	-V2	into it
(4)	0	0	1	3/2	3/4	Yal	
	R	-> R	, - R2			1	
1	,	6	0	3/4	-14	1/4	
	0	1	0	3/2	-1/2	-1/2	750
	0	0	1	-7/4	3/4	1/4)	
Nous		= (	3/4 312 -2/4	-1/4	1/4		

(4)

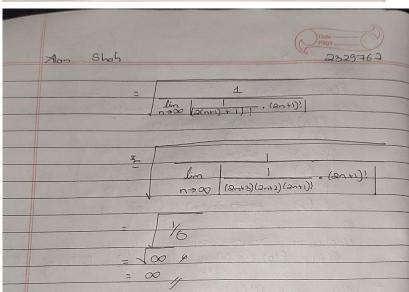
3. Determine whether the following sequence converges or diverges.

$$t_n = (-1)^{n+1} \, \frac{n+1}{n^2+3}$$

	Alan Oshah	2329767
	Colores of spiriting so lessings	Madan
30	$961^n$ .	
	1+ = (-1)n+1 n+1	(4)3
	h <sup>2</sup> +3	
	Poetling lim on In;	
	$= \lim_{n \to \infty} \frac{(-1)^{n+1}}{n^2+3}$	
	$n \rightarrow \infty$ $n^2 + 3$	
1 3 3 3	Course to the Course of the Co	
	$= \lim_{n \to +3} \frac{n+1}{n^2+3}$	
	n-> 00	
	n2 (1/n + 1/n2)	
	2(1)2(2)	
	n→00 n² (1+3/n²)	
	= 1/60 + 1/60	
	1 +360 : If so converge	s & ils convoyed.
		(4)

4. Find the Maclaurin series expansion of **Sinx**, also calculate the radius of convergence. (4).

	Alon (860)
	Alon Oshah 23 23763
и.	Obin.
	f(n) = gin(n)
	Now downless of P(n) = sin(n)
	$f(n) = \sin(n) = f(0) = 0$ $f'(n) = \cos(n) = f'(0) = 1$
	f''(n) = -9in(n) = p''(0) = 0
	$f'''(n) = -\cos(n) = f''(0) = -1$ $f'''(n) = \sin(n) = f''(0) = 0$
	f'(n) = 6050 cos(n) = f'(0) = 1
	Mad : O :
	Maclawrin Gories expansing, $f(x) = f(0) + f'(0) x + f''(0) x^{2} + f''(0) x^{4}$ 11: 2: 3!
	11 22 31 41
	+ (°(0)
	$P(n) = \sin n = 0 + n + 0 - n^3 + 0 + n^5 + \cdots$
	80, 00
	Sin no E (-1) 22 (-1) (-1)
	//
	Now,
	$\sum_{n=0}^{\infty} a_n n^{a_n+1} = \sum_{n=0}^{\infty} (-1)^n \frac{n^{2n+1}}{(a_n+1)!}$
	na o na o
	o", on = (-1) n+1 - (2n+1)!
	(an+1);
	01, 0= 2
	(2) -
B	Radius of covergence (R) = 1 lin (on+)
	V 17-00 50



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